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ABSTRACT

The relationship of nonintellectual factors to academic achievement in 58 Scottish high schools is examined. The main purpose of the study was to identify those features of student backgrounds which have a bearing on academic achievement. Factors studied include socioeconomic class, pupil and parental aspirations and attitudes, staffing and type of school, home characteristics, parental support, and pupil variables. The method used was to survey a cross section of 5,200 Scottish secondary school students, their parents, teachers, and school administrators. Researchers evaluated the confidential questionnaires and found that parental attitudes, student aspirations, and student abilities are more important than social class in determining academic achievement. Among the nine conclusions based on research results are that (1) the "experience of teachers" factor did not produce a consistent pattern; (2) teachers' forecasts and allocation to specific courses of study are of high predictive significance; and (3) students taught by a small number of teachers are likely to be high academic achievers. (Author/DB)

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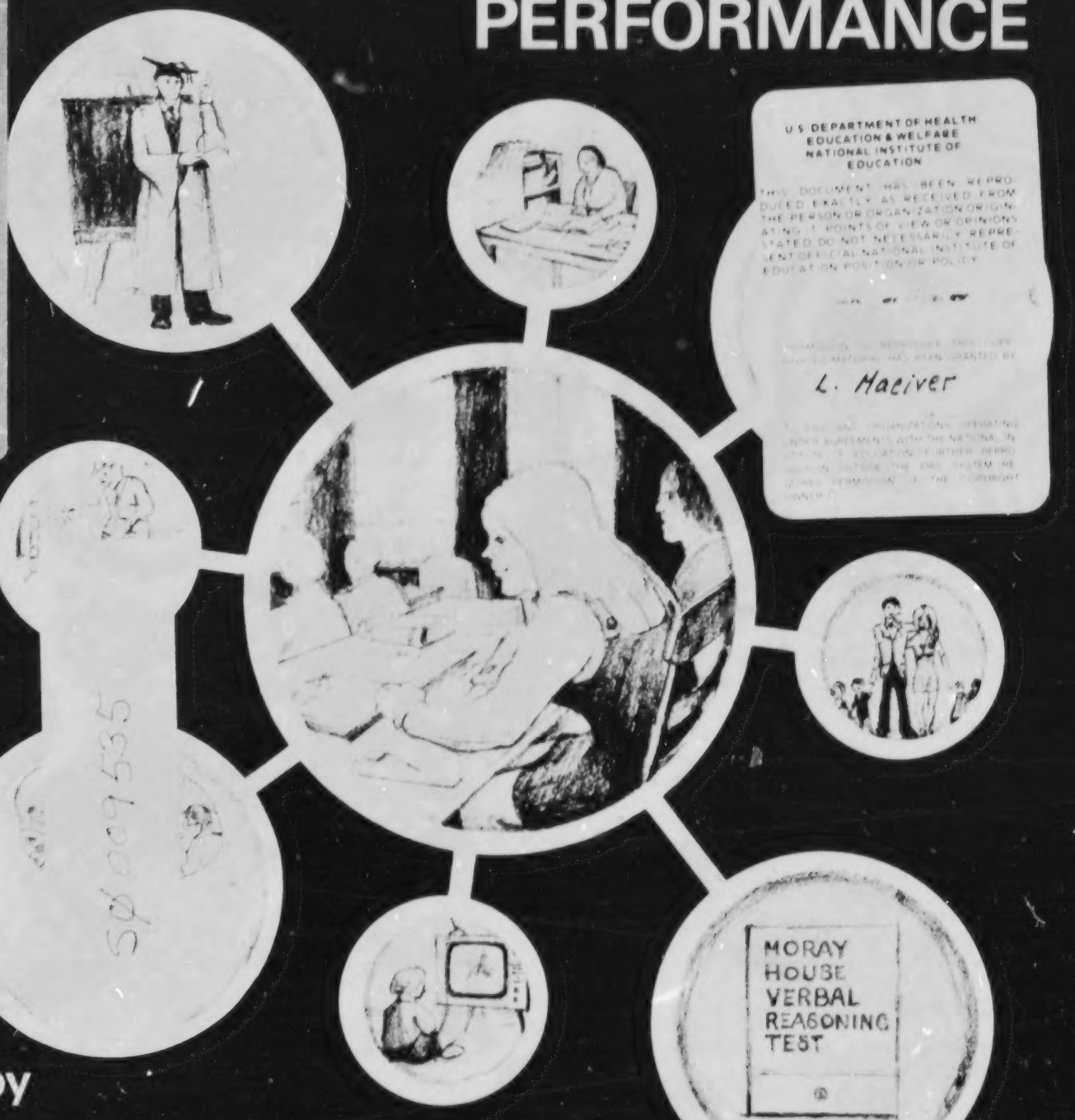
A STUDY OF NON-INTELLECTUAL FACTORS AFFECTING PUPILS' O-GRADE PERFORMANCE



by

.. Maciver and T. W. Fyfe

DUNDEE COLLEGE OF EDUCATION

A STUDY OF NON-INTELLECTUAL FACTORS AFFECTING PUPILS' O-GRADE PERFORMANCE

L Maciver
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Dundee College of Education

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School staff have been listed, not conventionally as data collectors only, but also as active research participants.

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Dundee
October, 1972.

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Morrison's Academy Girls' School
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Queen Victoria School, Dunblane
Lt. Col. W. C. Harrison, Head Teacher; Mr J. Willman, School Representative.

Some of the above schools no longer function under the above names. Where more than one Head Teacher or School Representative are named, this represents a change during the period of the investigation.

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CHAPTER 1.

Origins and Outline of Investigation

In Autumn, 1966, Dundee College of Education, in response to a general invitation from the Scottish Council for Research in Education, undertook an investigation into O Grade performance by pupils of below-average Verbal Reasoning Quotient at transfer stage. This Investigation now referred to as the Preliminary O Grade Investigation (1) involved an analysis of the performance of such pupils in the 1966 S.C.E. examinations, and led to a report to the S.C.R.E. in early 1967.

Two dimensions of this investigation are noteworthy:–

(a) The findings of the study were significant, and interesting, relating as they did to 277 "below-average" pupils sitting and passing O Grades, and to the subject-pattern of their attempts and successes.

(b) The preliminary investigation had involved the active co-operation of 30 secondary schools in the College area.

1. Plan and Rationale of the Secondary Schools Investigation

At a meeting in January, 1967, the Preliminary Investigation Research Committee were of the opinion that they, as an active group of teachers, should continue their involvement in school-based research, and that the topic of S.C.E. performance merited wider and more thorough investigation. Accordingly the meeting resolved to approach the Scottish Council for Research in Education for facilities to undertake a longitudinal study into secondary school performance. In May, 1967, the proposed research was authorised and financed.

The Directors of Education for Angus, Clackmannan, Dundee and Perthshire kindly granted permission to proceed with the Research in their respective areas.

2. The Involvement of Schools

A significant dimension of this research investigation has been the involvement, at all stages of planning and execution, of head teachers and representatives of the schools involved. Obviously the collection of masses of data would be quite impossible without the active participation of headmasters and their school representatives. All the local authority secondary schools in the area, and all direct grant schools presenting for O Grade examinations, agreed to participate, and furnish necessary data over a considerable period. Our grateful thanks to headmasters and representatives is recorded elsewhere.

But such an account of schools' participation still understates the involvement of head teachers and school representatives in this investigation, which can be summarised thus:–

(i) In the College area there are significant numbers of teachers in responsible position who see research as relevant, if not indeed essential, to the assessment of current educational situations and problems. Such educationalists, including head teachers and others, have a positive and informed contribution to make to educational research.

(ii) The head teachers and school representatives were involved throughout the investigation as members of the Investigation Research Committee, which met altogether on some 9 occasions including sub-committee meetings. Thus they participated, not only in the ongoing collection and supply of data, but also in decision-making concerning the nature of the investigation, both in general outline, and in specific detail.

(iii) The design of the investigation has resulted from the research desires of College Staff in interaction with the views and wishes of all members of the Research Committee. This has meant a broad survey as opposed to a tight "experiment-type" investigation, and the inclusion of various data, in accordance with the wishes of the Research Committee, somewhat counter to the wishes of College Staff to limit data as much as possible. The result has been a seemingly bewildering mass of data, representing 57 variables for each of 6,336 pupils and involving a 360,000-item matrix for computer analysis.

3. The Design of the Investigation

(i) **The Sample**: It was early decided to have a cross-sectional sample, as opposed to a "below-average – V.R.Q." sample.

(ii) **Sample Size**. Whereas research method indicated the desirability of initial sub-sampling for convenience, the Research Committee early decided to include all pupils of a year group in the study.

(iii) **Duration of Investigation**: The Research Committee wished a longitudinal study, with certain measures

obtained at critical stages well in advance of the actual S.C.E. examinations. A realistic compromise was decided on: viz. to study the cross section of pupils then in second year secondary, i.e. in early 1967, and to follow their progress through school until all had left. A further reduction of time-span was later achieved, by limiting the measure of S.C.E. achievement to O Grade results only.

(iv) **Nature of Investigation Data and Modes of Collection:** The Research Committee decided to use data on V.R.Q. and attainment, customarily employed as a basis for secondary course allocation, (2, 3.). They wished also to examine various features of the pupils' situation, in terms of home, personal circumstances, school, and peer-group. The broad range of data collated is indicated below. The reader is referred to Appendix 1 for facsimile forms used.

Form	Type	Description	Date Completed
SSI/1	Pupil	Aspirations; Out-of school activities; Family background.	June, 1967.
SSI/2	Parent	Parental aspirations for child. Parental wishes regarding homework. Home and work circumstances.	June, 1967.
SSI/3	Representative	Occupation of father or guardian. Parental support. Promotion assessment. Secondary course allocation.	June, 1967.
SSI/4	Teacher	Estimates for English, Arithmetic, French, and Homecraft or Technical Subjects.	June, 1967.
SSI/5	Organisation	School organisation, in terms of pupil category and class allocation.	November, 1967.
SSI/6 (1)	Pupil	Subject-teachers experienced by pupils over secondary course.	November, 1969.
SSI/6 (2)	Staffing	Staff list with qualifications and experience.	November, 1969.
SSI/7	Attitude	Richardson Attitude to School questionnaire.	Autumn, 1967.
SSI/8	Attitude	Richardson Attitude to Teachers questionnaire.	(Not administered to full sample.)
SSI/9	Attitude	Fyfe and Maciver Attitude to School questionnaire.	November, 1967.
SSI/10	Leavers	Record of school leavers.	Completed to cover leavers, from June, 1967, up to and including June, 1969.
SSI/11	Transfers	Record of pupil transfers.	At regular intervals.
SSI/12	O Grade Results	Record of S.C.E. estimates and results.	Estimates by March, 1969. Results by December, 1969.

4. Theoretical Basis

Although, at times, College staff felt that the realities of meaningful research design were somewhat ignored in the interests of meaningful involvement in decision-making by all research committee members, it is fair to say that every item on the forms previously described represents

(i) a hypothesis, by a practising headmaster or teacher, that the particular variable involved might conceivably affect S.C.E. performance of pupils, and

(ii) a majority decision by the Research Committee that such a hypothesis was relevant and should be subjected to investigation.

While the research suffers from a considerable overlap with previous investigations, its main justification may well be its meaningfulness for participating school staff.

The following account represents the broad developmental rationale of the research:–

(iii) **Intellectual Factors:** The Preliminary O Grade Investigation (1) revealed a significant number of "O Grade-successful" pupils, whose measured "intelligence" at transfer stage seemed to indicate no likelihood of O Grade success. The Research Committee were interested in investigating a full cross-section of pupils to assess the variance from conventionally predicted performance.

In line with noted prior Scottish investigations (2, 3) it was decided to obtain promotion Verbal Reasoning quotients.

The Research Committee felt that a measure of achievement obtained within secondary school could furnish a later estimate, more relevant to the S.C.E. examinations. Accordingly, it was decided to obtain, by the end of the second year, subject-teacher forecasts of the sample's likely S.C.E. performance in a representative group of S.C.E. subjects. (Form SSI/4).

(iv) **The Definition of "Non-Intellectual Factors"**: The wide range of data decided on rendered difficult the choice of a title for the Investigation. We are indebted to Dr. D. A. Walker, until recently Director of the Scottish Council for Research in Education, for his suggestion of "Non-intellectual factors". Several factors are "non-intellectual" in two important senses. Factors of home, pupil attitude and aspiration, etc., go beyond, and away from the traditional measures of intellect and attainment. Many of the measures employed, e.g. socio-economic class, attitude to school and size of family, show overall positive correlation with measures of intelligence and/or attainment. Nevertheless, any representative group of children, homogeneous in terms of measured intelligence or attainment to date, will show a fair heterogeneity as far as the non-intellectual factors are concerned. Various analyses throughout this report examine such sub-categories of pupils, e.g. homogeneous by intelligence but varying by attitude and S.C.E. achievement, in an endeavour to establish variance of performance by "non-intellectual" factors, as we have defined the term.

(v) **The Range of "Non-Intellectual" Factors Studied in the Present Investigation**:

Socio-economic Class.

Research Committee members were well aware of several recent educational studies which highlighted the effect of home on school performance and attainment. (4, 5, 6, 7, 9.)

They decided to obtain the occupation of father or guardian as a measure of socio-economic class. The Committee felt that a Scottish survey might reveal a different pattern of relationship between socio-economic class and educational attainment from that evidenced in English studies.

Home Factors.

The Research Committee were interested in details of the home environment, positively and negatively affecting school performance. Elizabeth Fraser's study (8) indicated differences in secondary school attainment correlating more with home circumstances (cultural, material, etc.) than with measured intelligence.

The Committee recognised the impossibility of penetrating the homes of a large sample of pupils to observe conditions, or of administering a large-scale questionnaire on such confidential matters.

The measures actually employed, while never deemed ideal, were chosen as suited to the large-sample situation.

Parental Support

The Committee had debated various possible measures of "home", including area of residence, type and size of house, family income. It was decided to categorise all pupils in terms of "parental support" on a 3-point, or A, B and C scale. Such categorisation was undertaken by school representatives in conjunction with headmasters and other responsible teachers. The categorisation was impressionistic, based on an amalgam of evident features, such as dress and deportment, regularity and punctuality of attendance, timely and conscientious completion of homework, and parental involvement in school visits or extra-curricular activities.

Pupil Variables

Various features, such as part-time work, membership of youth organisations and television viewing habits were included in the pupil's form, (and some also on the parent's form), because various teachers felt that such matters had a bearing on examination performance.

Similarly, features such as family size and place in family, as well as books and newspapers in the home, were included in the questionnaires because of their established concomitance with differential home and child-rearing "quality" and with differential educational achievement. (9, 5, 10.)

Pupil and Parental Aspirations and Attitude

Measures were obtained of pupil educational and vocational aspirations, and of parental aspirations for their children. A measure of children's attitude to school was also seen as useful.

Staffing

It was decided to investigate staffing qualifications and turnover, and their possible links with differential S.C.E. attainment by schools.

Type of School

Schools were classified as

(a) Senior or Junior Secondary
and (b) Omnibus.

CHAPTER 2

Sample, Measures and Validation

The number of schools in the sample was 60, i.e. all the secondary schools in the areas mentioned above including fee-paying schools. The criterion of selection was whether the school presented pupils at the S.C.E. examinations or fed other secondary schools which presented. Thus the only schools in the investigation area omitted from our sample are independent schools which presented their pupils for English examinations only.

The breakdown of the sample schools by area and type is:–

TABLE 1

Area	Rural Three Year	Four Year	Omnibus	Six Year	Total
Angus	6	2	4	1	13
Clackmannanshire	–	5	–	2	7
Dundee	–	7	2	4	13
Perthshire	13	6	5	3	27
TOTAL	19	20	11	10	60

Direct Grant and Independant Schools are included in these figures.

By omnibus schools, we mean six year schools which take in pupils of all abilities. Six year schools are those which take in only pupils who are regarded as being of certificate potential. Four year schools are those which contain pupils who, in the main, will leave school in the third year but also contain a small proportion of pupils who will sit O Grades.

Comprehensive re-organisation

None of the 60 schools had at the beginning of the investigation been affected by comprehensive re-organisation, but as the study progressed, changes in the organisation of some of the schools were made. In two cases, two schools were amalgamated, one of the rural three year schools became a two year "junior high", and two of the six year and four of the four year schools began to admit pupils of all abilities. With the exception of the two amalgamations, none of these changes directly effected the pupils in the sample. With the exception of one four year school which was unstreamed from the outset of the study, the pupils in our sample were in streamed classes.

The Area

The sample area is largely agricultural although it contains Scotland's third city and two large towns. It must be stressed that one third of the total sample of pupils was from schools in the city and that when the two large towns are included the proportion of the total sample in urban areas increases to more than 50%. The table below gives details of the population of the towns in which the sample schools are situated.

TABLE 2

	City (100,000+)	Large Town (15,000 - 100,000)	Small Town (2,000 - 15,000)	Village (2,000 –)
	1	2	18	17
Schools	13	6	24	17

It was decided to select **all second year pupils** in the above 60 schools in session 1966-67. This meant that relevant measures of aspiration and attitude were collected two years prior to O Grade presentation, while V.R.Q's were obtained retrospectively.

The total number of pupils in the second year of the sample schools in 1966-67 was 6,336. It was decided to omit from the study any pupil who fell into at least one of the following categories:

(a) Non completion of SSI/1 (pupil form).
(b) Non completion of SSI/2 (parent form).
(c) Occupation of parent/guardian missing.
(d) Verbal Reasoning Quotient missing.
(e) Pupils transferring to schools outwith the sample area.

When all the pupils who were affected in at least one of the above ways were excluded, the sample fell to 5,218. (82% of the total sample.) This sample of 5,218 is referred to hereafter as **the investigation sample or simply the sample.** When reference is made to the complete group of pupils, with which the investigation started, we shall refer to **the total sample.**

A comparison of the two samples reveals that only in the cases of three variables is there evidence of a significant difference (chi-square test) between the two samples. These three variables are:–

(a) Pupil certificate aspiration.

(b) School subjects forecast.

(c) Family size.

The differences indicate that for the investigation sample pupil certificate aspirations and subject forecasts are higher, while family size is lower. In the case of all other variables on pupils' and representatives' forms (15 in all), there is no significant difference between the samples. As far as V.R.Q. is concerned the investigation sample has a mean of 102 whereas the total sample's mean is 100. (Obviously the latter figure is based on a partial sample in view of the missing data.)

Thus the investigation sample seems somewhat more academically promising than the total sample, but not significantly different as far as most of the background variables are concerned.

The Measures Employed, and their Validation

Readers are referred to the actual questions on the questionnaires, included in Appendix 1. Obviously, in many instances, the very questions determine the categorisation of responses. For obvious reasons, however, some explanation of categorisation of responses is necessary.

Educational Aspiration

The relevant questions are Items 1, 2 and 3 on the Pupil's Form, and Items 1 and 2 on the Parent's Form. Classification of responses for both pupil's and parent's aspiration is as follows:–

(a) "Highers"

(b) "O Grade"

(c) "Non-certificate"

(d) "Don't Know"

It was decided to omit from the analysis data on school leaving aspirations, and on aspirations in different subjects.

Validation of Scale

TABLE 3: Number and mean V.R.Q. of pupils in each category of certificate aspiration.

	Higher Grade	Ordinary Grade	Non-certificate	Don't Know	Total
Number	1863	1471	1362	522	5,218
Mean V.R.Q.	111.9	101.1	92.3	95.5	102.1

TABLE 4: Number and mean V.R.Q. of pupils in each category of **parental** certificate aspiration.

	Higher Grade	Ordinary Grade	Non-certificate	Don't Know	Total
Number	2010	1418	1510	280	5,218
Mean V.R.Q.	110.8	103.0	90.5	97.7	102.1

Table 3 reveals a very close relationship between V.R.Q. and aspiration. As it is reasonable to expect that high V.R.Q. will lead to Higher Grade aspiration, some validation of the pupil responses is therefore provided.

Table 4, the parent's aspiration for the pupils, shows similar results.

Vocational Aspiration

For both pupil's vocational aspiration (SSI/1, Item 5) and parent's vocational aspiration for the child, the five categories of the Registrar General's Scale were employed, as indicated on the following page.

For both, a sixth category was employed to indicate "Don't Know". In analysis of parents' responses, an extra category of "Own Choice", indicating that the parent left the choice of occupation to the child, emerged as a distinctive response. Thus, the complete categorisation of responses to Question 5 on Pupil's Form and Question 3 on Parent's Form reads as follows:–

I	– Professional	e.g. Doctor, Lawyer.
II	– Managerial	e.g. Teacher, Bank Manager.
III	– Clerical, Skilled Trades	e.g. Post Office Clerk, Mechanic.
IV	– Semi-skilled Trades	e.g. Machine-operator.
V	– Unskilled Labour	e.g. Dustmen.
VI	– "Don't Know"	
VII	– Pupil's own choice (Parent's aspiration only)	

Pupil's or parent's choice was categorised on the higher level response, where differential responses were given.

For most of the analyses undertaken in the study, the 5 categories were further combined.

Validation of Scale

TABLE 5: Number and mean V.R.Q. of pupils in each category of vocational aspiration.

	Registrar-General's Scale					
	I	II	III	IV	V	Don't Know
Number	411	1417	2276	160	8	946
Mean V.R.Q.	114.0	108.4	97.3	90.3	84.5	101.2

TABLE 6: Number and mean V.R.Q. of pupils in each category of **parental** vocational aspiration.

	Registrar-General's Scale						
	I	II	III	IV	V	Own Choice	Don't Know
Number	294	1024	1514	62	2	241	2081
Mean V.R.Q.	113.1	107.8	97.2	91.9	84.5	108.8	101.1

The pupil and parental responses relate quite strongly with V.R.Q. indicating that, in a broad sense, the aspirations seemed to be realistic. From Table 6, it can be seen that the mean V.R.Q. of children whose parents stated that the children were free to choose their own occupation is well above average (108.8), and similar to that of children whose parents have professional aspirations for their children.

Occupation of Father or Guardian

This was likewise categorised on the 5-point Registrar-General's Classification, with one extra Category VI embracing "incomplete home", e.g. widow, lack of permanent employment of father.

We compared the socio-economic distribution, in terms of father's occupation grouped by Registrar-General's Classification, with that of the Plowden Report sample of 3,092, drawn from 10 Educational Divisions in England, (11) and reasonably representative of the national populace.

Table 7 indicates how the Plowden distribution compared with the Investigation sample:–

TABLE 7:

		Fathers of Primary School Children (Plowden)	Fathers of Secondary Scottish Children (Investigation)	Married Males aged 20 to 64 in General Population (Census, 1961)
I	Professional	4%	4%	4%
II	Managerial, including self-employed	14%	17%	16%
III	Non-manual, clerical, etc., and skilled manual	59%	47%	51%
IV	Semi-skilled	16%	23%	19%
V	Unskilled, labourer	6%	7%	7%
	Widowed, unemployed etc.	–	2%	–
	Unclassified	1%	–	3%
		100%	100%	100%

The important comparative socio-economic characteristics of the Investigation sample may be summarised thus:–

Category III, i.e. Clerical and Skilled, represents a significantly smaller percentage of the Investigation sample than of either the Plowden sample or the General Population. Categories IV and V, semi-skilled and unskilled labourers, embrace a significantly higher percentage of the Investigation sample than of either the Plowden sample or the General Population.

Part-time Work

It was decided to record "part-time work" or "no part-time work", for purposes of analysis. In the sample, 1723 pupils (33%) were engaged in some form of part-time work in their second year of secondary schooling.

Homework

TABLE 8: Comparison of pupil estimates of daily homework hours with parental "wishes".

	0 hrs.	½ hr.	1 hr.	1½ hrs.	2 hrs.	2½ hrs.	More than 2½ hrs.	Total
Pupils	1129	1863	1206	781	188	42	9	5218
Percentage	22%	36%	23%	15%	4%	1%	0%	101%
Parents	330	504	2194	1358	733	81	18	5218
Percentage	6%	10%	42%	26%	14%	2%	0%	100%

As can be seen, pupils' homework claims are considerably less than parents' wishes. The mean number of hours claimed by the pupils was three quarters of an hour per day whereas parents would like them to do roughly one and a quarter hours.

Responses were categorised "High" or "Low" with respect to homework, the cut-off point for the "High" category being 1 hour per night. Parents' responses were similarly categorised, with a higher cut-off point of 1½ hours, to allow approximately 50% in each category.

Club Membership

Answers were ultimately categorised on a basis of "Yes/No", i.e. Membership or Non-membership, whether of school or other clubs. 2843 pupils (54%) are members of "outside" clubs whereas 1838 pupils (35%) are members of school clubs.

Television Viewing

A list of 16 programmes was prepared by the Research Committee to include a broad range of "cultural" quality of programme, and a reasonable number and range for each channel, to accommodate reception limitations of certain areas.

Pupils were asked to underline programmes which they had "often watched". From their answers measures were derived of quality and extent of T.V. viewing.

(a) Quality of T.V. Viewing

Approximately 250 final-year College students rated the 16 programmes on a 1 to 7 scale, for "educational/cultural quality". The mean student ratings are included on the specimen Pupil's Form, SSI/1. It was found that no scatter of student's "judgements" showed a standard deviation greater than 1.2 and all items were included in the rating of pupil "quality of viewing". The resultant scale gave a wide discrimination i.e. 1.4 - 6.5. For each pupil a mean "quality of viewing" score was obtained. For purposes of computer coding mean scores ranging from 1+ to 6+ were converted to a 9-point scale to fit one column on the computer card.

Finally, for most analyses, T.V. quality ratings were dichotomised into "Low/High" as indicated in table 9.

TABLE 9: Number of pupils per T.V. Quality category.

	Low					High			
Code	1	2	3	4	5	6	7	8	9
Mean Score Range	less than 2 pts.	2 - 2.5 pts.	2.5 - 3.0 pts.	3.0 - 3.5 pts.	3.5 - 4.0 pts.	4.0 - 4.5 pts.	4.5 - 5.0 pts.	5.0 - 5.5 pts.	5.5+ pts.
Number of Pupils	720	909	1150	1520	527	271	71	34	16

(b) Extent of T.V. Viewing

A rough measure of T.V. viewing "time" was obtained from the actual number of T.V. programmes, underlined per pupil.

TABLE 10: Number of T.V. programmes watched "often" by the sample.

2 or less	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	Total
295	720	909	1327	904	409	150	100	5218

The data in Tables 9 and 10 are most likely to be subject to invalid measurement. However, Table 11 below indicates a fairly strong tendency for brighter pupils to watch fewer and better quality programmes than the less bright.

TABLE 11: V.R.Q. and No./Quality of T.V. Programmes.

V.R.Q. Band	Mean Number of Programmes watched "often"	Mean Programme Quality on 9-point scale
70/79	7.3	2.5
80/89	7.5	2.8
90/99	7.3	3.1
100/109	7.1	3.4
110/119	6.7	3.5
120/129	6.5	3.8
130 +	6.3	3.4

Books in Home

Both pupils and parents were asked to judge the approximate number of books in their home.

Numbers on the actual form were then coded on a 0 - 6 scale for computerisation. Finally, for analysis, the "books in home" scale was dichotomised into "Low/High" with 100 books representing the top of the "Low" category, for both pupils and parents.

TABLE 12: Pupil and parental estimates of the number of books in the home.

No. of Books	0	5	25/50	100	150	200	More than 200	Null Response	Total
Pupil	84	187	1212	1811	795	383	746	–	5218
Parent	89	144	1696*	1287	688	371	733	210	5218

*By an oversight the category, 50 books, was omitted from the pupil's form. For comparison the 50 book category for the parents is included with the 25 category.

The table reveals a remarkably similar trend for both pupils and parents.

Daily Papers for both Pupils and Parents

An attempt was made to quantify pupil responses mainly in terms of quantity and quality of papers read. (E.g. 2 points for Daily Telegraph, Scotsman, Times, and 1 point for Daily Express, Daily Mirror.) Number of papers read ranged widely, with any measure of differential "quality" often being cancelled out by number and heterogeneity of choices. Ultimately, it was decided to abandon this measure as inadequate.

Size of Family and Place in Family

Two modes of categorisation were employed, as indicated in Tables 13 and 14.

TABLE 13: Number of pupils in each "family position".

First Child	Intermediate Child	Last Child	Only Child	Total
1507	1764	1469	478	5218

Size of Family

In coding this information, to accommodate the punch-card column, all families of 10 or more were categorised together as shown in Table 14.

TABLE 14: Family size for pupils in the sample.

1	2	3	4	5	6	7	8	9	More than 9	Total	Mean
478	1351	1273	904	509	327	175	84	50	65	5218	3.48

The mean family size for this sample is somewhat higher than that which might be obtained in a national sample for two reasons.

(a) obviously no household with no children could have been included in the sample.

(b) since the pupils were 13/14 years old at the time of the collection of this information, they were more likely to belong to completed families than younger children similarly questioned.

Working Mother

The final two questions on the Parent's Form, relating to books and whether both parents were working, were "optional" as the instructions indicate. The invitation to leave blank, if desired, seems to have contributed both to the high percentage of parent's forms returned (91%), and also to the extra information given at times.

Responses to the question on "working parents" were categorised as per Table 15:–

TABLE 15: Number of mothers in each category.

	Not Working	Working	Widowed	Separated: Divorced	Null Response	Total
Number	2946	2066	39	9	158	5218
Percentage	56%	40%	1%	0%	3%	100%

Parental Support

School representatives, in conjunction with the head-teacher and/or responsible colleagues, categorised sample pupils in terms of "Parental Support". The categories A, B and C, indicated high, medium and low support.

This variable is probably a broad composite embracing not only general parent support but also possibly "halo" effect from other dimensions of the teachers' percept of the pupils' total personality. As Table 16 shows (12) this variable correlated very highly with the pupil attitude to school scale.

TABLE 16: Parental Support and Pupil Attitude.

	Richardson			Fyfe and Maciver		
	Mean	S.D.	N.	Mean	S.D.	N.
Category A	6.40	1.30	1046	23.81	3.21	539
Category B	6.07	1.46	1099	22.65	3.78	832
Category C	5.72	1.46	386	21.33	4.16	178

All of these differences were significant at 0.001 level. (t. test).

Verbal Reasoning Quotients

For 97% of the investigation sample two V.R.Q's were furnished, and the average taken. In less than 1% of cases where the "I.Q." quoted was not necessarily a Moray House Verbal Reasoning Quotient, it was treated as if it were. Verbal Reasoning Quotients were categorised in 10-point bands (e.g. 70 - 79, 80 - 89).

A small number of pupils with V.R.Q. below 70 were included in the 70 - 79 band.

TABLE 17: Number of pupils in each V.R.Q. band.

70 - 79	80 - 89	90 - 99	100 - 109	110 - 119	120 - 129	130 - 139	140+	Total
183	527	1438	1758	929	297	80	6	5218

Mean V.R.Q. = 102.1

Subject Forecasts

S.C.E. Forecasts were furnished by teachers of English, Arithmetic, French, Technical Subjects and Homecraft. It was found impracticable to include Technical Subjects or Homecraft as elements of a representative "composite" forecast score, as many "Certificate" pupils had no ratings. A "composite" forecast score incorporating English, Arithmetic and French, was based on a 6-point scale, ranging from "Definitely Not O Grade" (O) to "H Grade Definite" (5). As there is no H. Grade for Arithmetic, the maximum composite score is obviously 5 + 3 + 5, i.e. 13.

TABLE 18. Number of pupils in each school forecast category for the three subjects.

	Definitely Not O Grade	O Grade Doubtful	O Grade Possible	O Grade Definite	Higher Possible	Higher Definite	Total
English							
Number	1988	734	758	540	517	681	5218
Percentage	38%	14%	15%	10%	10%	13%	100%
Arithmetic							
Number	1894	768	995	1561	–	–	5218
Percentage	36%	15%	19%	30%	–	–	100%
French							
Number	3363	345	405	398	349	358	5218
Percentage	64%	7%	8%	8%	7%	7%	101%

When for each pupil a "Total Forecast Score" was calculated, this was divided into the four categories as shown in Table 19.

TABLE 19: Number of pupils in each total forecast score category.

	A 0 points	B 1-4 points	C 5-8 points	D 9-13 points	Total
Number of Pupils	1483	1664	1000	1071	5218
Percentage	28%	32%	19%	21%	100%

It can be seen that only 28% of pupils were regarded as not having any chance in any of the three subjects. Undoubtedly, some of this group would be rated in some other subjects. It does appear, then, that few pupils (about one quarter) in all the secondary schools in the area were regarded by their teachers as having no chance at all in any subject.

Pupil's Attitude to School and to Teachers

The main measure of "Attitude to School" employed was the Richardson Attitude to School Questionnaire, which is described below. The Research Committee had considered pupil's attitude to school and teachers important contributory factors towards S.C.E. exam success/failure, and decided to use the Richardson Attitude to School Questionnaire (Appendix 1).

Arrangements had to be modified in the light of experience. Several individual head teachers, and at least one authority, refused permission to administer a proposed "Attitude to Teachers" questionnaire, which was therefore discarded from the analysis. Similarly, the headmasters in one authority refused to allow the "Attitude to School" questionnaire. We decided to construct and substitute a less controversial "Attitude to Schools" questionnaire.

Thus the attitude measures employed in the research analysis are

(a) the Richardson Attitude to School questionnaire and
(b) the Substitute Attitude to School questionnaire.

The Substitute Attitude to School Questionnaire

1. This questionnaire was prepared to obtain some attitude rating for a large proportion of the sample, for whom the Richardson Questionnaire was disallowed.
2. Scoring of the questionnaire was devised on a 5-point scale for each item, as indicated on the copy in Appendix 1. Such scoring would yield a maximum of 30 for the 6 items.
3. A questionnaire administration was arranged for a sub-sample of pupils, for whom results on the Richardson Attitude to School Questionnaire were already available. The correlation between the two sets of scores for the pupils (N = 103) in this school was high (r = 0.83).

The Richardson questionnaire and the substitute questionnaire were also compared on the basis of some 20 variables. (12). The relationships between each of the scales and each variable were in all but two cases identical. The variables which showed different relationships were Working Mothers and Pupil Part-time Job. The Richardson questionnaire showed that both children of non-working mothers and pupils who have no jobs have a significantly more favourable attitude to school than those engaged in work, whereas the substitute questionnaire revealed no significant differences between these categories. This can be explained by different community values reflected in the two different samples.

It was decided to standardise the Richardson questionnaire to the substitute questionnaire's mean and standard deviation using the common school mentioned above as the link, and, having done this, to adopt broad categories of scores, as is shown in Table 20 below.

TABLE 20: Number of pupils in each attitude category.

	Null	Poor	Average -	Average+	Good	Total
Range of Score	–	less than 18 points	18 - 21 points	22 - 25 points	more than 25 points	
Number of Pupils	1413	444	903	1606	852	5218
Percentage	27%	9%	17%	31%	16%	100%

S.C.E. Performance

This measure is central to the entire investigation, and may be deemed "the criterion" for most comparisons.

School representatives returned data on "presentation" and performance in all subjects. Table 21 indicates the "O Grade" data initially tabulated and coded for all sample pupils on 4th Year O Grade courses during Session 1968 - 69.

TABLE 21: Number of Subjects.

	Number of Subjects	1	2	3	4	5	6	7	8	More than 8	Total
A	Number of pupils starting O Grade courses on 4th Year	17	39	83	231	332	526	658	486	94	2466
	Percentage	0%	1%	2%	4%	6%	10%	13%	9%	2%	47%
	Number of Subjects	1	2	3	4	5	6	7	8	More than 8	Total
B	Number of pupils attempting	16	63	129	304	405	484	559	433	62	2455
	Percentage	0%	1%	2%	6%	8%	9%	11%	8%	1%	47%
	Number of Subjects	1	2	3	4	5	6	7	8	More than 8	Total
C	Number of pupils passing	187	263	300	337	304	323	348	252	34	2348
	Percentage	4%	5%	6%	6%	6%	6%	7%	5%	1%	45%
	Number of Subjects	1	2	3	4	5	6	7	8	More than 8	Total
D	Number of pupils with passes at Band 5 and above	495	234	154	118	88	77	40	18	–	1224
	Percentage	9%	4%	3%	2%	2%	1%	1%	0%	–	23%

The significant details from the above table are that slightly under half (45%) of the investigation sample obtained at least one O Grade pass, and that almost 20% obtained 6 subjects. It should be remembered that these percentages refer to all the pupils in the sample. Further, nearly a quarter of the sample have obtained at least one pass at Band 5 and above.

Thus the 72% regarded by teachers as having at least an outside chance of one subject has diminished to 45% by the time the examination results are known.

Quality of Certificate

For such a large-scale investigation, and for computer tabulation, some single composite measure of certificate performance semmed desirable because of range of subjects, and range of performance bands.

We derived a 5-category scale, paralleling but not identical with that employed by Douglas (10). The categories are named and described in the table following:–

Number	Category Name	Definitive Description
1	"Good Certificate"	4 or more passes, including English, and passes in at least two of the three categories of:– (i) Mathematics (ii) Science subjects (iii) Languages other than English
2	"Average Certificate"	4 or more passes, but not fulfilling the conditions of a "Good Certificate"
3	"Poor Certificate"	1 to 3 passes
4	"Attempted Certificate"	Sat 1 or more O Grades, but passed none
5	"Non-certificate"	Sample pupils who did not sit any O Grades in 1968

TABLE 22: Number of pupils in each "Type of Pass" category.

	Good Certificate	Average Certificate	Poor Certificate	Attempted Certificate	Non Certificate	Total
Number	1024	577	747	107	2763	5218
Percentage	20%	11%	14%	2%	53%	100%

Various other items of information collected and used in the research are self-explanatory, and are dealt with as they arise in the report. Records of school-leaving dates, first employment if available, information on Further Education involvement, etc. were maintained by school representatives and periodically returned. Similarly dates of transfer to another school were recorded and returned. Finally, the more specialised measures employed in categorising staffing and types of school are detailed within the appropriate sections of the report.

Problems of Analysis

A major problem associated with a survey, amassing a variety of data, is that of selecting an appropriate method of analysing complex data. Two dimensions of this problem may be instanced. Different measures may be independent, or they may overlap to an indeterminate extent. Thus, for instance, while "father's occupation" and "measured V.R.Q." seem quite different measures, there is some overlap between socio-economic class and (mean) V.R.Q. in that higher socio-economic groups or classes have higher mean V.R.Q's. Secondly, in a complex educational situation, simple cause-effect relationships are difficult to define, because the various factors we measure are liable to interact with one another, as well as with what the researchers choose to designate as the relevant variable. Because of its complexity, and the variety of alternative approaches, the problem of complex, overlapping data has no ideal solution. Researchers, however, must endeavour some ranking or clustering of variables, however difficult this is.

A Basic Bivariate Matrix – Intelligence by Socio-Economic Class

We were led, largely by our awareness of main currents in well-known research (2, 7) to give Intelligence and Socio-Economic Class predominance. We decided to use a basic bivariate table, with different V.R.Q. bands along one axis, and different socio-economic categories, based on Registrar-General's classification of father's employment, along the other. Table 28 reveals the matrix at fairly detailed level, although we used various combinations of categories for economy. This matrix enabled us to examine the pattern of O Grade results for various groups, homogeneous in terms of V.R.Q. and Socio-economic Class.

Correlation of Each Measure with O Grade Results

It is procedurally essential, despite the complexity and indeterminate overlap of variables involved, to relate each "non-intellectual factor" directly to O Grade results. Almost all our variables show concomitance at significant level with O Grade results. However, the extent of concomitance is in some instances very low, although significant, as e.g. in the case of part-time work correlated with O Grade achievement. For any bivariate table, where a significant link between a particular measure and O Grade results is revealed, this statistical significance cannot be ignored. On the other hand, a whole series of matrices of bivariate tables reveals a wide range of extent of concomitance. By such a process, the bearing of all single measure or variables on O Grade results, or rather the extent of overall concomitance, can easily be ranked.

A survey encompassing many measures has a certain advantage over a more rigid study of one or two variables, where statistical significances may be found. Thus, for example, by analysis of our data, class size may be found to relate to O Grade performance. Such a finding could well be both methodologically and statistically sound. The danger is, however, that such a finding could become a prescription for O Grade success to be widely applied to schools. Such an interpretation, however, would ignore the fact that other variables may correlate much more highly with certificate success and be much more worthy of educationists' attention.

The procedure for initial analysis is straightforward. The results for each "measure" are dichotomised into "Positive – Negative", or "High – Low", as indicated earlier. Phi-correlations were obtained between each measure and O Grade results.

CHAPTER 4

NON-INTELLECTUAL FACTORS AND 'O GRADE' RESULTS

Order of Concomitance with O Grade Results of Individual Measures

Table 23 below indicates the results obtained by the procedure detailed in Chapter 3.

TABLE 23:

	Variable	Concomitance with O Grade Results Phi-correlation
1.	Course Allocation	0.64
2.	Certificate Aspiration (pupil)	0.61
3.	French Forecast	0.58
4.	English Forecast	0.57
5.	Arithmetic Forecast	0.56
6.	Certificate Aspiration (parents)	0.56
7.	V.R.Q.	0.55
8.	Job Aspiration (pupil)	0.49
9.	Homework (pupil)	0.38
10.	Job Aspiration (parents'	0.37
11.	Books (parents)	0.31
12.	Homework (parents)	0.31
13.	Books (pupil)	0.30
14.	Parental Support	0.29
15.	Socio-economic	0.28
16.	Family Size	0.23
17.	Attitude	0.20
18.	Family Order	0.19
19.	T.V. Viewing – quality	0.19
20.	School club (yes)	0.17
21.	Outside club (yes)	0.10
22.	School Size (large)	0.08
23.	Part-time work (no)	0.08
24.	T.V. Viewing – quantity (few)	0.08
25.	Class Size (large)	0.07
26.	Working Mother (no)	0.04
27.	Sex (Male or Female)	0.01

(Each variable versus Pass/Fail)

In the case of variables 20-26, the bracketed explanation indicates the end of the scale associated with Pass.

Results

We are bound now to caution against rash "over-interpretation" of findings, for the following reasons:–

(i) Concomitance does not indicate a direct "cause-effect relationship" but may involve other causes altogether, which our multi-variable investigation may, or may not, have included.

(ii) In addition to the relationship with O Grade success, many variables correlate with, or overlap, each other as, e.g. V.R.Q. and Course Allocation.

Some regard is appropriately paid to extent of concomitance or non-concomitance. Thus, for example, Course Allocation is interpreted as having more bearing on O Grade results than Part-time Work, because of its higher correlation.

Course Allocation

This variable expectedly heads the ranking. The emergence of course allocation as a major determinant of O Grade success/failure, does not, of itself, shed light on several important questions associated with differential streaming into different certificate and non-certificate courses. We still require to comment on the appropriateness of the prediction of "certificate" or "non-certificate" course-allocation, even within a self-fulfilling system.

Measures of Aspiration

Measures of aspiration, and especially of pupil's expressed intention to do O Grades, correlate highly with O Grade success. Further investigation seems essential to examine whether these measures of aspiration show fair concomitance in their own right, irrespective of differential course allocation, V.R.Q. or attainment. It must be emphasised that these measures of pupil and parental aspiration were chosen in an endeavour to get behind broad measures of difference such as socio-economic class. The high ranking of all measures of aspiration, both by pupils and parents, and towards vocational as well as educational attainment, seems to indicate something more than aspirational reflections of either socio-economic position or of pupil attainment to date. Sustained positive aspirations by parents and pupils appear, per se, to correlate with pupil perseverance and attainment.

Subject Forecasts

It is significant that all subject forecasts, assessed independently by 2nd Year subject teachers, should cluster so precisely in ranking. Such considerations still leave open, for later analysis, the vital question of whether subject forecasts, presumably reflecting class marks, prove motivating and therefore "success-inducing" for the child, as for instance parental aspiration might appear to.

Verbal Reasoning Quotient

In placing V.R.Q. in appropriate perspective, we would contrast the earlier over-significance attached to I.Q. measures by researchers and educationists alike with the more recent tendency to emphasise socio-economic class, relegating I.Q. or V.R.Q. to second place, as unduly "culture-loaded",and a mechanism of socio-economic overprivilege or underprivilege.

We would stress at the outset the actual V.R.Q. measure, concentrating mainly on its correlation with O Grade attainment. We have earlier indicated the overlap between different measures, and now merely re-emphasise the obvious relationships between V.R.Q. and course allocation and subject-forecasts. Nevertheless, statistically, other interesting measures, and especially measures of parental and child aspiration, correlate as highly with O Grade success as V.R.Q. does. Furthermore, V.R.Q., pupil aspiration and parental aspiration all show higher concomitance with results than does parental occupation, the common measure of socio-economic class.

TABLE 24: Numbers attaining S.C.E. Passes by V.R.Q. Band.

Quality of S.C.E. Certificate Achievement

V.R.Q. Band	Good	Average	Poor	Attempted	Non-Certificate	Total
70 - 79	0	1	1	0	181	183
80 - 89	1	4	9	14	499	527
90 - 99	30	52	161	46	1149	1438
100 - 109	261	295	393	42	767	1758
110 - 119	438	177	164	5	145	929
120 - 129	221	43	15	0	18	297
130 - 139	67	5	4	0	4	80
140+	6	0	0	0	0	6
TOTAL	1024	577	747	107	2763	5218

TABLE 25: Percentage of each V.R.Q. Band attaining different Categories of S.C.E. Pass/Fail.

V.R.Q. Band	Good	Average	Poor	Attempted	Non-Certificate	Total
70 - 79	.0	0.5	0.5	.0	98.9	99.9
80 - 89	0.2	0.8	1.7	2.7	94.7	100.1
90 - 99	2.1	3.6	11.2	3.2	79.9	100.0
100 - 109	14.8	16.8	22.4	2.4	43.6	100.0
110 - 119	47.1	19.1	17.7	0.5	15.6	100.0
120 - 129	74.4	14.5	5.1	.0	6.1	100.1
130 - 139	83.8	6.3	5.0	.0	5.0	100.1
140+	100.0	.0	.0	.0	.0	100.0

Tables 24 and 25 clearly reflect a high degree of correlation between "measured intelligence" and S.C.E. achievement, exemplified at extremes by 98.9% of pupils with V.R.Q's below 80 having no S.C.E. success, and 100% of pupils with V.R.Q's above 140 obtaining good certificates.

It has been argued both that verbal "intelligence" tests are too similar to school work to measure something very different from school attainment, and that such tests really largely reflect environmental and cultural quality and opportunity rather than "native wit". Yet it must be stressed that the V.R.Q. measures involved in this study were based on results obtained at Primary 6 and Primary 7 stages of the pupils' career, i.e. on average 4-5 years before the pupils actually sat O Grade exams. In view, then, of the relatively early stage of the V.R.Q. "prognosis", i.e. decidely at pre-secondary stage, the extent of the correlation between V.R.Q. at age 10-12 and S.C.E. attainment at approximately is noteworthy.

The evidence in Tables 24 and 25 suggests that, on a sample or "population" basis, V.R.Q. data furnish fair prognosis of later S.C.E. achievement. Such a statement may warrant the retention of such measures at transfer stage, preferably for purposes of "guidance and counselling", or as part of a broad profile of attainment and potential, to be used in the child's interests, rather than as a basis for precise and premature pupil-categorisation, which the "exceptions" in Tables 24 and 25 reveal to be unwarranted.

Briefly, Table 24 reveals that, for significant minority groups, V.R.Q's did not serve as a sound prognosis of later achievement. Later analyses reveal interesting "exceptional" performers, usually differentiated on measures other than V.R.Q.

Fathers' Occupation as an Index of Socio-Economic Class

Table 26 reveals Fathers' Occupations, classified on the Registrar-General's Scale, as a significant concomitant of O Grade success, but ranking only in intermediate position.

This evaluation of parental occupation, as an index of "educational achievement prognosis" is very interesting. It can be fairly cogently argued that parental occupation, as an index of socio-economic class, does reflect general differential characteristics of pupils' homes, both materially, and perhaps more importantly, culturally and in terms of educational opportunity and motivation.

Yet the intermediate ranking of parental occupation suggests that these general "class" differences, at least as they affect the attainment of our sample, are **not** "statistically **the** major explaining variable" of underachievement, as Kahl (14) argues they are. There are other major variables, such as books in the home, estimates of homework, etc., which seem to be more than equivalent with socio-economic xlass as significant measures of prognosis, more suggestive of direct or indirect measures of pupil motivation or acculturation, fairly readily obtainable even for a large sample, and less emotive than socio-economic class as measures.

Owing to our involvement in teacher-training, we feel that the substitution of socio-economic differences for I.Q. differences in educational thought, especially when removed from direct research evidence may lead to unwarranted pupil-stereotyping as well as to an attitude as extreme and as damaging as that previously linked with I.Q. differences.

A More Detailed Analysis of Parental Occupation and O Grade Results

TABLE 26: Socio-Economic Class by S.C.E. Performance.

Registrar-General's Classification of Parental Occupation	S.C.E. CERTIFICATE CATEGORY					
	Good	Average	Poor	Attempted	Non-Certificate	Total
I	122	21	27	2	17	189
II	375	118	121	8	270	892
III	401	319	423	64	1253	2460
IV	90	89	128	27	859	1193
V	23	20	35	3	281	362
Other	13	10	13	3	83	122
TOTAL	1024	577	747	107	2763	5218

TABLE 27: Socio-Economic Class by S.C.E. Performance – Percentages.

Registrar-General's Classification of Parental Occupation	S.C.E. CERTIFICATE CATEGORY					
	Good %	Average %	Poor %	Attempted %	Non-Certificate %	Total %
I	64.6	11.1	14.3	1.1	9.0	100.1
II	42.0	13.2	13.6	0.9	30.3	100.0
III	16.3	13.0	17.2	2.6	50.9	100.0
IV	7.5	7.5	10.7	2.3	72.0	100.0
V	6.4	5.5	9.7	0.8	77.6	100.0
Other	10.7	8.2	10.7	2.5	68.0	100.1
TOTAL	19.6	11.1	14.3	2.1	53.0	100.1

Class III was not subdivided into the categories of "white-collar" and "blue-collar" workers, roughly equating with office-workers and tradesmen. Obviously, the table confirms socio-economic background of pupils, measured in terms of father's occupation, as significantly correlating with attainment in S.C.E. examinations.

It must, of course, be remembered that father's occupation is not, per se, an ideal measure of differential home background, in terms of the cluster of variables associated with socio-economic class, ranging from housing, area of residence, and possession of or non-possession of "status symbols", such as dishwashers and modern cars on the material side, to more subtle home attributes of speech, motivation to achieve educationally, and, in toto, differential socialisation of children on the "cultural" side. Nevertheless, it is significant that classification of pupils by father's occupation, translated into Registrar-General's Categories, does yield interesting evidence of differential S.C.E. achievement for a Scottish sample.

Percentages of the investigation sample attaining different categories of certificate performance are as follows:–

"Good" Certificate	20%	
"Average" Certificate	11%	45%
"Poor" Certificate	14%	
Attempted but failed	2%	
Non-certificate	53%	

By contrast, 65% of children whose fathers are in Registrar-General's Class I occupations obtained "Good" certificates, while 90% of such children at least gained some passes. On the other hand, the children of unskilled workers, i.e. those in Registrar-General's Category V, can boast only 6% with "Good" certificates, only 22% with any certificate passes at all, and of course, 78% without any S.C.E. achievement.

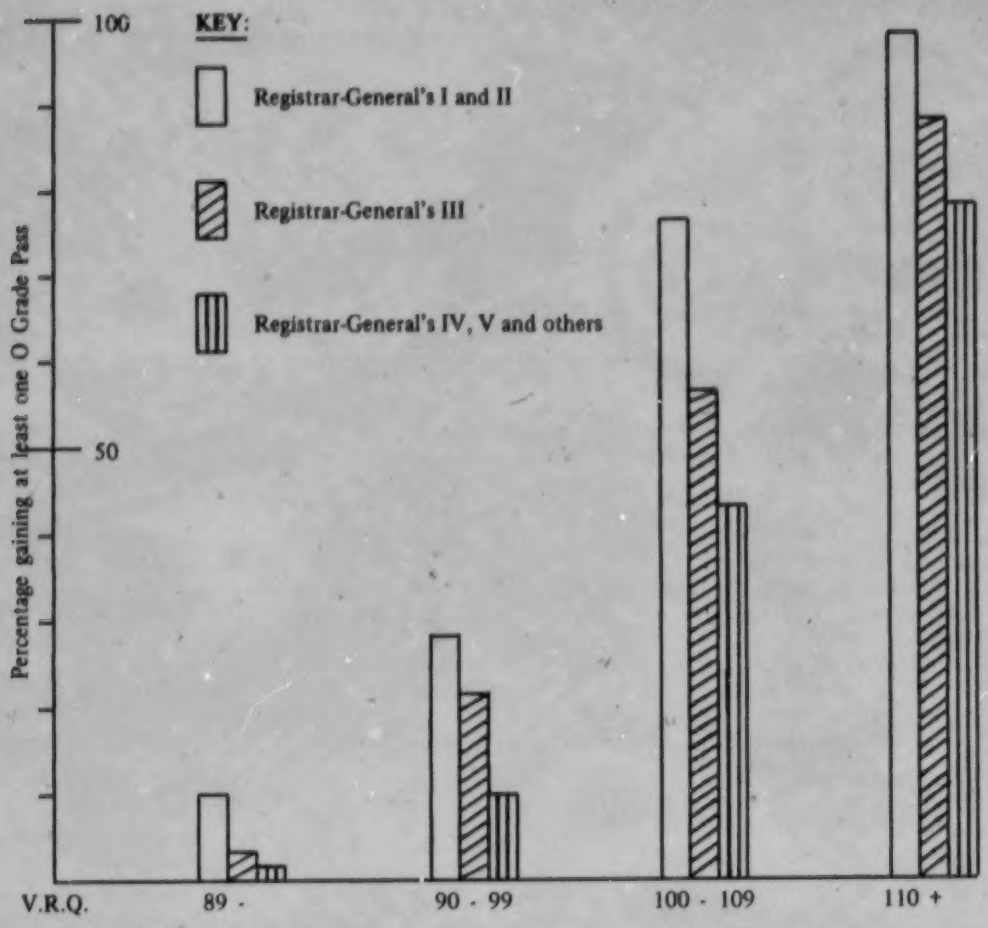
The evidence of Table 27 strongly suggests that socio-economic inequality of opportunity still exists, although not necessarily only in terms of entry or non-entry to favoured or high-status (e.g. Grammar-school type) schools. Furthermore, educational measures to improve the "opportunity" and more precisely to secure the certificate attainment of significantly greater numbers of children of "blue-collar" workers seem to be still necessary.

Finally, in connection with Table 27, it seems worthwhile to relate our findings to previous studies. Elizabeth Fraser (8) concluded that assessments of home environment furnished a better prognosis of secondary school success than promotion V.R.Q's. Although our results reveal both V.R.Q. and socio-economic class as significant concomitants of S.C.E. success or failure, our detailed tables confirm our ranking of significances, indicating socio-economic class as less significant than V.R.Q.

For example, of the socio-economically "favoured" Categories I and II, 287 out of 1081, or 26.5%, obtained no certificate passes, indicating that, although being in such a socio-economic position is educationally advantageous overall, it by no means guarantees S.C.E. success. On the other hand, for those similarly favoured in terms of V.R.Q., roughly speaking, i.e. those with V.R.Q's above 110, irrespective of socio-economic class, only 167 out of 1306, i.e. 12.8% gained no certificates at all. Similarly, a comparison of "unfavoured" pupils reveals, for instance, that while 1140 out of 1555 pupils in Registrar-General's Categories IV and V, i.e. 73.3%, obtained no S.C.E. passes, for pupils of V.R.Q. below 100, i.e. almost half of the sample, 1829 out of 2148, or 85.1% gained no certificate passes. As the Tables 24 and 25 reveal, furthermore, extreme categories show almost nil chances of success for pupils with V.R.Q. below 80, a degree of educational mediocrity not nearly paralleled by Registrar-General's Category V!

Thus, by our indices, it can hardly be said that our measure of home back-ground, viz. father's occupation, is a less accurate predictor of secondary achievement than V.R.Q., a fact highlighted in Table 28.

TABLE 28: Percentages, gaining one or more O Grade, of Pupils categorised by V.R.Q. and Parental Occupation.



Estimates of Homework

Preliminary analysis revealed, not surprisingly, a positive association between both estimates of homework, and socio-economic class. A common emphasis in research commentary has been on class-differentiated facilities for homework, typified by the following quotation from Dale and Griffith (15):

"One of the most obvious differences between the social classes, for our purposes, is in the facilities – or handicaps – which help or hinder the pupil while doing homework. Though this provision is sometimes merely a reflection of the attitude of the parents towards education, and the priority which they give to other things, such as radio, television, and entertaining, it is often largely determined by limitations of accommodation and by finance."

We are in no position to disagree utterly with such a statement. We could, however, focus attention on homework, and its concomitants and effects, rather than excessively on social-class differences. Thus, it seems, again by no means surprisingly, that time spent on homework, to judge by pupil estimates of actuality, and parental estimates of expectation, correlate with O Grade achievement.

It seems from our findings that parental expectation correlates overall with homework actually done. Although both parental expectation and actual time spent on homework are probably dependent on parental attitudes, and on limitations of accommodation and finance, we feel that parental expectation of home work is of itself a more direct mechanism of "homework motivation", and therefore a mechanism of O Grade achievement.

Books in the Home

This measure features as one index of the cultural quality of homes in Fraser's study (8). Our analysis, interestingly based on questionnaire returns, confirms Fraser's findings.

Parental Support

It is interesting that this measure, always assessed by the head teacher and/or responsible senior staff members, and furnished in three broad categories should also correlate at intermediate level with O Grade success. It could, of course, be argued that estimates of parental support would be largely saturated by the "halo effects" of socio-economic class, and particularly of course allocation. Where, however, we discussed the parental support categorisation with head teachers, at times as they actually collaborated, say, with the depute head in placing pupils on the "parental support" scale, we were impressed by their professed ability to categorise realistically, and with specific reference to evidences of "home support", in terms of dress, punctuality and regularity, interest and finance for pupil extra-mural activity.

"The presence of a large number of siblings (or some factor related to it) is an adverse element as far as educational attainment is concerned, quite apart from the low intelligence usually associated with large families." (8) This adverse effect has furthermore been found to operate irrespective of socio-economic class (7, 16.)

In view of such evidence, our findings in relation to family size and family order are expected. They could be paraphrased thus:

(a) Children from smaller families tended consistently to do better in O Grades than children from larger families.

(b) Intermediate children, i.e. those other than single, first or last in order of birth, did less well in terms of O Grade results.

Attitude

Perhaps no single measure involved so much work on the part of researchers, school representatives, and College colleagues collaborating in questionnaire administration as this measure. Our early computer analysis revealed significant relationships between attitude and V.R.Q., school stream, and school size, with a trend towards lower mean attitudes for larger schools. (12). Now, however, our analysis reveals positive attitude to school as a significant but low-level concomitant of O Grade success, correlating overall with achievement to a lesser extent than the sixteen variables already treated. This low-ranking of attitude among all the variables treated seems, however, to be due to two features, treated further below, viz.

(a) the effect of attitude to school on O Grade success is blurred by other variables, such as course allocation, and

(b) the nature and extent of correlation between attitude to school and O Grade success are not similar over the whole sample.

Factors of Slight or Insignificant Concomitance with O Grade Results

TABLE 29:

Rank	Variable	Phi-Correlation
19	Television Viewing (Quality)	0.19
20	School Club (Yes)	0.17
21	Outside Club (Yes)	0.10
22	School Size (Large)	0.08
23	Part-time Work (No)	0.08
24	Television Viewing (Quantity)	0.08
25	Class Size (Large)	0.07
26	Working Mother (No)	0.04 0.04
27	Sex	0.01

In view of the slightness of concomitance of all the variables from No. 20 to 27, we feel detailed comment is unnecessary. They represent, in terms at least of our findings, variables which might easily be over-emphasised educationally, especially if treated in isolation.

Hierarchy of Variables with Course Allocation and Parental Socio-economic Status removed

Table 30 presents an analysis of 25 variables, with Course Allocation and Socio-economic class removed. This analysis deals with 4 groups, each relatively homogeneous in terms of course allocation and in terms of father's occupation, as the following brief contrasting descriptions indicate:–

(a) Professional Certificate
(b) Professional Non-certificate
(c) Non-professional Certificate
(d) Non-professional Non-certificate

Furthermore, it must be stressed that, for each of the remaining 25 variables, 4 contingency tables were prepared, and separate tests applied. Thus the mean Phi-Correlations cover 4 sub-groups in each case, while the right-hand columns indicate numbers of contingency tables yielding results at 0.01 and 0.05 levels of significance.

TABLE 30: Order (when Course Allocation and Socio-economic background extracted).

		Mean Phi-correlation	Significances (4) 0.01	0.05
1.	Certificate Aspiration (pupil)	0.41	4	–
2.	Certificate Aspiration (parent)	0.35	4	–
3.	French Forecast	0.32	4	–
4.	Arithmetic Forecast	0.31	4	–
5.	English Forecast	0.31	4	–
6.	V.R.Q.	0.24	4	–
7.	Job Aspiration (pupil)	0.22	4	–
8.	Attitude	0.21	4	–
9.	Job Aspiration (parent)	0.18	4	–
10.	Books in Home (pupil)	0.16	4	–
11.	Homework (pupil)	0.16	3	1
12.	Parental Support	0.15	4	–
13.	Homework (parent)	0.15	3	1
14.	Books in Home (parent)	0.14	3	–
15.	T.V. Rating (high)	0.13	4	–
16.	Family Size (low)	0.09	2	–
17.	Position in Family (ext.)	0.09	2	–
18.	Class Size (large)	0.07	–	1
19.	Outside Club (yes)	0.05	–	1
20.	Part-time Work (no)	0.05	1	–
21.	School Club (yes)	0.05	1	1
22.	No. of T.V. Programmes (low)	0.02	1	–
23.	Working Mother (no)	0.02	2	–
24.	Sex (boy/girl)	0.02	–	2**
25.	School Size	0.00	–	–

** One difference in favour of boys, one in favour of girls.

Results of Analysis

Table 30 reveals that, overall, the hierarchical pattern of variables is maintained. More vitally, perhaps, the first fifteen of these factors remain significant concomitants of O Grade achievement for relatively homogeneous groups in terms of parental occupational level and course allocation. Scholastic aspiration of pupils and parents may be said, for instance, to operate positively towards O Grade performance, irrespective of the parental occupation, or of the initial course allocation of pupils at secondary stage. Teachers' forecasts also remain fair, although by no means absolute predictions of achievement for all sub-groups. One major change, however, is the move of attitude from position 17 in Table 23 to position 8 in Table 30.

Attitude to School and O Grade Achievement

A more detailed analysis was conducted into the concomitance of differential attitude scores with O Grade success-failure for sub-groups homogeneous in terms of measured Intelligence (Verbal Reasoning Quotient) and Socio-economic status. Table 31 below summaroses the findings, concentrating on extreme attitude scores.

The attitude scores were grouped as follows:– Poor (6 - 17), Average Minus (18 - 21), Average Plus (22 - 25), Good (26 +). Table 31 below contrasts "Poor" with "Good" Attitude, but indicates for each sub-category the total number, i.e. also including numbers in both "Average" Categories.

TABLE 31:

Socio-Economic Class	V.R.Q. Band	Attitude Category	Fail	Pass	Percentage Pass	Differential "Success Ratio"
1. Professional (Total: 192 pupils)	100-	Poor	24	1	4%	1 : 11
		Good	26	17	43%	
2. Skilled (Total: 705 pupils)	100-	Poor	105	4	4%	1 : 6
		Good	122	41	25%	
3. Semi-skilled, unskilled, etc. (Total: 679 pupils)	100-	Poor	121	1	1%	1 : 18
		Good	118	26	18%	
4. Professional (Total: 252 pupils)	100 – 109	Poor	15	8	35%	1 : 2
		Good	14	52	79%	
5. Skilled (Total: 687 pupils)	100 – 109	Poor	43	17	28%	1 : 2
		Good	61	107	64%	
6. Semi-skilled, unskilled, etc. (Total: 407 pupils)	100 – 109	Poor	35	7	17%	1 : 4
		Good	33	55	63%	
7. Professional (Total: 334 pupils)	110+	Poor	4	16	80%	1 : 1.25
		Good	69	69	100%	
8. Skilled (Total: 406)	110+	Poor	13	17	57%	1 : 1.6
		Good	9	79	90%	
9. Semi-skilled, unskilled, etc. (Total: 143 pupils)	110+	Poor	5	8	62%	1 : 1.4
		Good	3	20	87%	

Note that "Poor" and "Good" categories combined form only part of total pupils in each "Socio-economic – V.R.Q." section, as analysis omits intermediate attitude categories "Average -", and "Average +".

Table 31 illustrates strikingly that a measure of "Attitude to School" differentiates significantly within certain homogeneous groups, (in terms of V.R.Q. and socio-economic background), with reference to O Grade results. For those "intellectually at risk", extreme differences in attitude to school can enhance or worsen "certificate chances" by as high a factor as 18! Even in the "above average" range of ability, this measure, at positive extreme, seems to boost "certificate success" chances by a factor of as much as 2 or 3.

CHAPTER 5

Parental and Pupil Aspiration, Teacher Forecast, and O Grade Achievement

Introduction

Our interest lay also in variables such as parental aspiration, pupil aspiration, and teacher forecasts, as they might correlate with O Grade achievement.

We were aware of possibilities that certain of these variables would operate interdependently, and interested to discover, if we could, which single measures or combinations showed most concomitance with O Grade performance.

Assessment of Brookover's Findings in Relation to the Present Investigation

Prior evidence of the potency of parental influence (17,18) on pupil self-concept and academic performance suggested a comparison between Parental Aspiration, Pupil Aspiration and Teacher Forecasts. An analysis of O Grade results for groups differing in patterns of aspiration gives some indication of how various prognostic indices may interact.

The Measures Employed

For every measure, pupils were dichotomised into "High/Low" or "Plus/Minus", as indicated in Table 32 below. This process of dichotomised variables is procedurally important, in that it figures both in this analysis, and in the more detached statistical analysis which is employed in Chapter 6.

TABLE 32

Variable	High or Plus	Low or Minus
Socio-Economic Class	Registrar-General's classification: Categories I and II	Registrar-General's classification: Categories III(a), III(b), IV, V, and our heterogeneous "Category VI"
Course Allocation	Allocation to "Higher" or "O Grade" Course on Secondary Entry	Allocation to "Non-Certificate" Course on Secondary Entry
Parental Aspiration	Expressed desire, when child was in Secondary 2, that child should sit O Grades and/or Highers	Expressed desire, when child was in Secondary 2, that child should leave school at 15, or "don't know"
Pupil Aspiration	Expressed desire, in Secondary 2 to sit O Grades and/or Highers	Expressed desire, in Secondary 2 not to sit O Grade and/or Highers, or to leave school at 15, or "don't know"
Composite Teachers' Forecast	Composite Score of 0 – 3*	Composite Score of 4 – 13*
O Grade Results	Pass in 1 or more O Grades	No O Grade Passes, or did not sit O Grades

* See Chapter 2 for calculation of composite scores

Parental Aspiration and Teachers' Composite Forecasts, compared with Pupil Aspirations

For this analysis both Course Allocation and Socio-economic Class were controlled, yielding 4 relatively homogeneous pupil groups.

For each of these pupil groups phi-correlations were obtained between

(i) Parental aspiration and Pupil aspiration
and
(ii) Composite Teachers' forecast and Pupil aspiration.

The results are shown in Table 33 below:–

TABLE 33

(a) Parental aspiration correlated with Pupil apsiration. (numbers in each group in brackets)

Socio-economic Class	Course Allocation: Plus	Course Allocation: Minus
Plus	+0.51 (819)	+0.62 (262)
Minus	+0.59 (1834)	+0.67 (2303)

(b) Composite Teachers' Forecast correlated with Pupil aspiration. (numbers in each group in brackets)

Socio-economic Class	Course Allocation: Plus	Course Allocation: Minus
Plus	+0.24 (819)	+0.37 (262)
Minus	+0.41 (1834)	+0.28 (2303)

The results presented in Table 33 may be summarised thus:–

(i) For pupils of the same Socio-economic Class and Course Allocation, both Parental Aspiration and Composite Teachers' Forecast correlate positively and significantly with Pupil Aspiration in all instances.

(ii) The phi-correlations are higher in the case of Parental Aspiration than in the case of Composite Teachers' Forecast.

Interpretation of Results

These results support Brookover's (17,18) findings that Parental aspirations significantly affect pupil's concept, and aspirations.

In the case of Composite Teachers' Forecast, interpretation is more difficult. To a great extent this measure is an index of pupil achievement, i.e. of "actuality", rather than as aspiration. Nevertheless, such achievement, and also the teachers' appraisal of pupils' academic standing or potential, may be said to be conveyed directly, via actual results, and indirectly via teacher comment, attitude to and appraisal of pupils. Teachers' forecasts may be said to contribute to the pupils' self-concept, although not as strongly as Parental aspirations.

Nature of "Mismatchings" of Parental Aspiration and Composite Teachers' Forecast with Pupil Aspiration

TABLE 34

(a) Parental Aspiration and Pupil Aspiration – Extent and Direction of "Mismatchings". (numbers in brackets)

Socio-economic Class	Course Allocation: Plus		Course Allocation: Minus	
	Higher than Pupil	Lower than Pupil	Higher than Pupil	Lower than Pupil
Plus	*2% (16)	1% (8)	16% (45)	3% (8)
Minus	4% (73)	4% (73)	14% (322)	7% (161)

(b) Composite Teachers' Forecast and Pupil Aspiration – Extent and Direction of "Mismatchings". (numbers in brackets)

Socio-economic Class	Course Allocation: Plus		Course Allocation: Minus	
	Higher than Pupil	Lower than Pupil	Higher than Pupil	Lower than Pupil
Plus	**2% (16)	7% (57)	1% (3)	35% (92)
Minus	3% (55)	14% (257)	2% (46)	27% (622)

** Percentages based on the total number in each cell.

* "Mismatchings": Where Parental aspiration or Composite Teachers' Forecast were at variance with Pupil aspiration.

Interpretation of Tables of "Mismatchings"

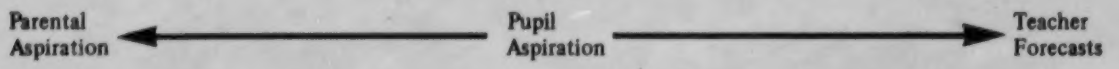
Table 34 above shows the extent and direction of such "mismatchings" within each pupil group. The low percentages give a rather clearer picture of teacher/pupil and parent/pupil agreement since the correlations quoted in Tables 33 (a) and (b) are affected by the homogeneity of the samples. The emerging patterns of "mismatchings" are extremely interesting. The interest lies in balance or imbalance of percentages, and more particularly in the direction of imbalance where this occurs.

(i) For "Course Allocation Plus" pupils, of either Socio-economic Class Category, equivalent percentages of pupils show higher and lower Parental aspirations. (Table 34 (a) on previous page).

(ii) For "Course Allocation Minus" pupils, on the other hand, by far the most of the misfits (17% and 14%) represent higher Parental aspirations than Pupil aspiration, while only a minority represent lower Parental aspiration (3% and 7%). Two reasonable subjective explanations of this imbalance are obvious – such high Parental aspirations are unrealistically positive, or alternatively, more modest Pupil aspirations represent realistic reaction to "minus" or non-certificate course allocation.

(iii) Table 34 (b) on previous page reveals a clearly uniform directional trend over all 4 pupil groups. Clearly, in the vast majority of "misfit" cases, the Composite Teachers' Forecast is lower than Pupils' aspiration.

Position of Pupil Aspiration in relation to Parental Aspiration and Composite Teacher Forecast



The evidence of the preceding tables may be represented diagrammatically as above:–

(a) For the whole sample studied, mean Parental aspiration is higher than mean Pupil aspiration.

(b) The analysis of "Mismatchings" strongly suggests that teacher forecasts are lower than both Pupil and Parental aspirations.

(c) We would suggest that the above model, however simple, is functionally dynamic within secondary education. In other words, in the case of individual pupils. Pupil aspiration which has been the core variable of the present analysis is (like intelligence) somewhat plastic rather than constant, and liable to continuous influence by teachers and parents.

Contrasting Groups of Pupils

We extended this investigation of aspirations to include an examination of the O Grade performance of contrasting sub-groups of pupils, employing all the five dichotomised measures described and employed in this chapter.

We divided initially by Course Allocation into 2 groups and then further sub-divided by Socio-economic Class, giving 4 groups. Then dividing by Parental Aspiration, Composite Teachers' forecast and Pupil's Aspiration, 32 groups were obtained.

The groups generated by this procedure, and listed in Table 35 below, are all internally homogeneous in terms of Course Allocation, Socio-economic Class, etc. Whereas the five-fold sub-division obviously generates 32 sub-groups, several of these were too small to merit separate consideration. Accordingly, where possible subdivision created one or more groups of less than 30, sub-division was discontinued. For a more detailed explanation of the procedure, see Appendix 2.

TABLE 35

COURSE ALLOCATION "MINUS" MEAN ACHIEVEMENT INDEX: 0.13

Above Mean O Grade Achievement Index for "COURSE" Pupils

Serial No.	No. in group	Description	Achievement	No. of Passes	Level of Significance*
1	37	SOC EC+, PAR ASP+, CTF+, (PUP ASP+)	.73	27	.01
2	181	SOC EC-, PAR ASP+, CTF+, (PUP ASP+)	.59	107	.01
3	85	SOC EC+, PAR ASP+, CTF-, (PUP ASP+)	.29	25	.01
4	464	SOC EC-, PAR ASP+, CTF-, (PUP ASP+)	.25	116	.01

Not Significantly Different from Mean Achievement Index for "COURSE" Pupils

5	46	SOC EC-, PAR ASP-, CTF+, (PUP ASP-)	15	7	NS

Below Mean Achievement Index for "COURSE-" Pupils

Serial No.	No. in group	Description	Achievement	No. of Passes	Level of Significance*
6	163	SOC EC-, PAR ASP-, CTF-, (PUP ASP+)	.06	10	.01
7	294	SOC EC-, PAR ASP+, CTF-, (PUP ASP-)	.06	17	.01
8	43	SOC EC+, PAR ASP+, CTF-, (PUP ASP-)	.05	2	.05
9	97	SOC EC+, PAR ASP-, (CTF-), (PUP ASP-)	.04	4	.01
10	1155	SOC EC-, PAR ASP-, CTF-, (PUP ASP-)	.01	12	.01

N(COURSE-)= 2565

* All as compared with mean achievement index for "COURSE" pupils i.e. 0.13.

COURSE ALLOCATION "PLUS" MEAN ACHIEVEMENT INDEX: 0.76

Above Mean O Grade Achievement Index for "COURSE+" Pupils

11	819	SOC EC+, (PAR ASP+),(CTF+), (PUP ASP+)	.89	726	.01*
12	1332	SOC EC-, PAR ASP+, CTF+, (PUP ASP+)	.84	1117	.01

Below Mean Achievement Index for "COURSE+" Pupils

13	53	SOC EC-, PAR ASP-, CTF+, (PUP ASP+)	.58	31	.01
14	239	SOC EC-, PAR ASP+, CTF-, (PUP ASP+)	.53	126	.01
15	49	SOC EC-, PAR ASP+, CTF-, (PUP ASP-)	.22	11	.01
16	35	SOC EC-, PAR ASP-, CTF+, (PUP ASP-)	.11	4	.01
17	126	SOC EC-, PAR ASP-, CTF-, (PUP ASP-)	.05	6	.01

N(COURSE+) = 2653 N(Total Sample): 5218

*All as compared with mean achievement index for "COURSE+" pupils i.e. 0.76.

Abbreviations

COURSE	Course Allocation
PAR ASP	Parental Aspiration
(PUP ASP)	Pupil Aspiration
SOC EC	Socio-Economic Class
CTF	Composite Teachers' Forecast (English, Arithmetic, French)

Notes:

(1) Bracketed descriptions, e.g. (PUP ASP-) indicate that the category includes a large majority, but not a totality, of this description.

(2) O Grade Achievement Index represents the percentage in the group of "O Grade+" pupils, as previously defined, converted to a decimal fraction.

Interpretation of Table 35

The table requires little comment, but merits considerable study. Certainly a separate comparison of all pairs and permutations of pupil groups is impossible. We have decided to treat "Course Allocation -" and "Course Allocation +" pupils separately initially, and then to highlight some cross-comparisons. The reader is also referred to Apendix 2 for a ranked list of all groups.

Pupils Allocated to Non-Certificate Courses on Secondary Entry

Numerically, and in terms of the policy which thus allocated them, this category represents "the other unacademic half" to parody Newsom (19). On secondary entry their course and class allocation reflected a firm categorisation as unsuitable for academic work. The fact of 13% O Grade success, in terms of 1 or more O Grade passes, reflects a certain post-transfer flexibility and opennessof school organisation and an extension of "O Grade accessibility" beyond anything envisaged when O Grades were introduced in 1962.

The contrasting O Grade Achievement Indices for the different groups are interesting evidence for the importance of aspirations as indices of "O Grade chances".

The two common features characterising all above average groups among non-certificate achievers are Parental and Pupil Aspiration.

While professional parentage (SOC EC+) and positive Composite Teachers' Forecast (CTF+) are overall positive features, it is interesting to note that, considering these variables singly, positive and negative, "Socio-economic Class" and "Composite Teachers' Forecast" are both represented twice in the four pupil-categories above the mean achievement index.

		Achievement Index
3.	SOC EC+, PAR ASP+, CTF-, (PUP ASP+)	.29
4.	SOC EC-, PAR ASP+, CTF-, (PUP ASP+)	.25
5.	SOC EC-, PAR ASP-, CTF+, (PUP ASP-)	.15

Group 4 of 464 pupils, by far the largest group of non-certificate pupils above mean O Grade Achievement Index, furnish very interesting evidence of the importance of aspiration. Although working-class, and having negative Composite Teachers' Forecast, these pupils, with positive parental and pupil aspirations, show an Achievement Index of 0.25, i.e. roughly twice the mean Achievement Index for non-certificate pupils, and almost on a par with their "SOC EC+" counterparts in Group 3 (Achievement Index 0.29). Indeed, we would hazard that Groups 3 and 4 represent the continuing dynamic influence of positive aspiration on achievement, in spite of negative attainment up to the end of S2. It is noteworthy, too, that Group 5, not significantly different from the Mean O Grade Achievement Index in their attainment, and below Groups 3 and 4, have positive teachers' forecasts, although they are negative on both aspirations, and are of working-class origin.

		Achievement Index
9.	SOC EC+, PAR ASP-, (CTF-), (PUP ASP-)	.04
10.	SOC EC-, PAR ASP-, CTF-, (PUP ASP-)	.01

In commenting on the "under-achievers" among non-certificate pupils. Group 10, consisting of 1155 pupils, are obviously numerically most important. With an Achievement of 0.01, they may be said to represent the hard core of genuine non-certificate pupils, at least within the system operating until 1968. The fact that they are negative on all four variables in the group-description is interesting. Group 9, with an Achievement Index of 0.04, might be read as meaning that professional parentage enchances the chances of pupils negative in attainment, and in parental and pupil aspiration, by a factor of four. We would, however, deprecate such as interpretation, because of the high improbability of any O Grade success within both categories.

Pupils Allocated to Certificate Courses on Secondary Entry

The overall O Grade Achievement Index of 0.76 is, perhaps, not surprising. Yet, even allowing that Education Authorities and schools may allocate generously to certificate courses, 24% of the "top half" at transfer stage did not gain any O Grades.

As in the case of non-certificate pupils, however, the different pupil-groups merit more discussion than the total situation.

		Achievement Index
11	SOC EC+, (PAR ASP+), (CTF+), (PUP ASP+)	.89
12	SOC EC-, PAR ASP+ CTF+, (PUP ASP+)	.84

Groups 11 and 12, representing 81% of Certificate Pupils in the sample, show high achievement indices (0.89 and 0.84). In brief, these groups suggest that, with positive Composite Teacher Forecast, the aspirations, chances of O Grade success are good, with Socio-economic class, making slight, but educationally almost insignificant, difference. We could add, of course, that the sizeable minorities from these groups (i.e. a total of 300) who had no O Grade success, would merit further analysis, although we have not, as yet, undertaken this.

		Achievement Index
12.	SOC EC-, PAR ASP+, CTF+, (PUP ASP+)	.84
13.	SOC EC-, PAR ASP-, CTF+, (PUP ASP+)	.58
14.	SOC EC-, PAR ASP+, CTF-, (PUP ASP+)	.53

The groups below the Mean O Grade Index constitute minorities of interest. It is notable that the highest Achievement Index, i.e. 0.58 for Group 13, is well below the Mean Achievement Index for certificate pupils, and also, to anticipate later cross-comparison, below the two top Achievement Indices for non-certificate pupils (viz. 0.73 and 0.59 for Groups 1 and 2).

In terms of our measures, all the certificate pupil groups below Mean Achievement Index of 0.76 are "SOC EC-" i.e. not the children of professional parents. But this description above does not distinguish them from the 1332 children in Group 12, who with an Achievement Index of 0.84, relatively over-achieved.

The critical difference between Group 12 and Group 13 is Parental Aspiration, this difference being reflected in a "drop" in Achievement Index from 0.84 to 0.58.

Similarly Group 14 differ from Group 12 only in their negative Composite Teachers' Forecast, which is reflected in an Achievement Index "drop" from 0.84 to 0.53.

A comparison between Groups 13 and 14, differing only on Parental Aspiration and Composite Teachers' Forecast, might suggest that, for this group of certificate pupils, negative Teachers' Forecast might be slightly more damaging than negative Parental Aspiration (Achievement Index 0.53 for Group 14, as opposed to 0.58 for Group 13). More significant however is the fact that both of these groups with positive pupil aspirations still show "O Grade chances" of over 50%.

					Achievement Index
15.	SOC EC-,	PAR ASP+,	CTF-,	(PUP ASP-)	.22
16.	SOC EC-,	PAR ASP-,	CTF+,	(PUP ASP-)	.11
17.	SOC EC-,	PAR ASP-,	CTF-,	(PUP ASP-)	.05

Groups 15, 16 and 17, representing 4% of our sample, and almost 8% of the certificate pupils in it, reveal severe underachievement (Achievement Indices 0.22, 0.11 and 0.05, with a mean Achievement Index of 0.10, i.e. below the non-certificate mean of 0.13). While this composite group of 210 may be excused on the grounds that "some will always fail", or even because they are negatively described in terms of almost all our variables, yet such complacency seems unwarranted. They have been categorised as of reasonable promise, in terms of certificate course allocation at transfer stage. To this extend they have failed miserably to make good early promise of obtaining O Grades. To the extend that we can describe such pupils, and suggest areas where their "description" at least might be modified by school organisation and policy, we deem it fitting to discuss this category (probably numbering about 3,000 per annum for the whole of Scotland) in some detail.

Group 17 seem to represent the "ideal type" of severe certificate underachievement to use the sociological term. This group are "working-class", lacking in certificate aspiration themselves, a lack evidently reinforced by their parents, and underachieving by the end of second year, in their teachers' estimation, although they showed promise at the transfer stage. Such a dismal list seems to represent an "educo-pathological" constellation, placing such pupils at severe risk, even although they were categorised as "certificate pupils" at the outset.

Furthermore, if Brookover's studies (17,18) and our evidence within this chapter are to be taken seriously, Parental aspiration and Pupil aspiration, both negative, must be seen as contributing to negative Composite Teachers' Forecast, and to negative O Grade achievement. Scrutiny of Groups 16 and 15, comparing each in turn with Group 17, reinforces this impression. Group 16, with positive Composite Teachers' Forecast, do twice as well (Achievement Index 0.11), although still very poorly. Group 15, with positive Parental aspiration do four times as well (Achievement Index 0.22), even although their Composite Teachers' Forecast is negative. Group 14, overtly differing from Group 17 only in aspiration of parents and pupils, do eleven times as well as Group 17, (Achievement Index 0.58 as opposed to 0.05).

The question of how such "certificate disadvantage" children might have their "certificate chances" improved is discussed in Chapter 10.

Equivalent Achievers among Non-Certificate and Certificate Pupils

Within broad limits, Table 36 shows a range of paired equivalent achievers from certificate and non-certificate pupils. In view of our low criterion of O Grade success, successful pupils in one of the paired groups may in fact have a higher standard of achievement. It is important to notice that the failure Index represents the same for both groups in each comparison - i.e. pupils did not gain any O Grades!

In Table 36 below, the underlined variables indicate the contrast in each pair.

TABLE 36: Pairs of Equivalent Certificate and Non-Certificate Achievers

	Serial No.	No. in group	Description				Achievement Index	Failure Index
A	2	181	COURSE-,	SOC EC-,	PAR ASP+,	CTF+, (PUP ASP+)	0.59	0.41
	13	53	COURSE+,	SOC EC-,	PAR ASP-,	CTF+, (PUP ASP+)	0.58	0.42

	Serial No.	No. in group	Description			Achievement Index	Failure Index
B	4	464	COURSE-, SOC EC-,	PAR ASP+,	CTF-,	(PUP ASP+)	0.25	0.75
	15	49	COURSE+, SOC EC-,	PAR ASP+,	CTF-.	(PUP ASP-)	0.22	0.78
C	5	46	COURSE-, SOC EC-,	PAR ASP-,	CTF+,	(PUP ASP-)	0.15	0.85
	16	35	COURSE+, SOC EC-,	PAR ASP-,	CTF+,	(PUP ASP-)	0.11	0.89

For these pairs, course advantage (for COURSE+ pupils) or disadvantage (for COURSE- pupils) may be said to have been levelled off by other factors.

Thus, Parental aspiration appears as the balancing factor for Comparison A and Pupil aspiration for Comparison B.

There is no balancing factor for Comparison C, the descriptions varying only on Course Allocation. These groups, of working-class pupils, still showing O Grade promise at the end of Secondary 2, but lacking both parental and personal aspiration, probably contain pupils who obtain no O Grades by virtue of early leaving.

Class, Second Year Attainment and Aspiration related to Achievement

A final scrutiny of Table 35 with particular reference to vertical patterns of "SOC EC", "PAR ASP", "CTF", and "PUP ASP" leads to the following interpretations:

1. Socio-economic Class

"SOC EC+" and "SOC EC-" groups are fairly mixed over the whole range of non-certificate pupil categories, with somewhat poorer O Grade chances for "SOC EC-" pupils, other things being equal (e.g. Groups 1 and 2, Groups 3 and 4, Groups 9 and 10).

By far the greater number of working-class Certificate pupils are in Group 12, where aspirations and forecasts are all positive. Their O Grade chances are only very slightly poorer than those of their "SOC EC+" counterparts in Group 11. This large certificate-pupil group may indeed represent an interaction of positive course allocation and attainment with both parental and pupil aspiration - some possible evidence of "achievement sponsoring."

For all the certificate pupil groups below the Mean Achievement Index. "SOC EC-" is a common factor. While the disadvantage is significant but not severe, if there are at least TWO other positive features in the profile (as in Groups 13 and 14), the disadvantage in O Grade Chance is severe in categories with one or no other positive feature. In other words, working-class certificate pupils who lack more than one of parental aspiration, personal aspiration and positive Composite Teachers' Forecast, are educationally at risk. We feel bound to emphasise "working-class in combination with other adverse factors" here, because the majority of working-class certificate pupils, the highly successful Group 12, show positive attainment.

2. Composite Teachers' Forecast

For non-certificate pupils, CTF- characterises all categories below the Mean Achievement Index, and CTF+ two of the four categories above the Mean Achievement Index. For certificate pupils the top three categories, i.e. 11, 12 and 13, all show CTF+, while all but one of categories 14 to 17 show CTF-. Thus, not unexpectedly, Composite Teachers' Forecast relates meaningfully to differential O Grade performance.

Yet, as we have already illustrated by examples, this forecast, actually a reflection of second year attainment, and the one composite "academic" prognosis employed in this chapter, is by no means the most valid predictor of O Grade success within the present analysis. Groups 3 and 4 perform well above par for non-certificate pupils, despite CTF-, as indicated earlier. A negative teachers' forecast seems damaging to the chances of Group 14, but not catastrophically so. In all cases where "CTF-" pupils perform seriously below par, i.e. (Groups 6 - 10, 15, 17) the pupils are uniformly negative in at least one aspirational measure - that of the pupil in all instances except Group 6. Nor does the positive forecast characterising Group 16 redeem their severe underachievement very much!

3. Parental and Pupil Aspirations

All groups performing above the Mean Achievement Index, both in the case of non-certificate and certificate pupils, have positive aspiration, both parental and personal. All pupils performing below Mean Achievement Index, both certificate and non-certificate pupils, are negative on at least one aspiration measure, while the bottom two categories, each for both certificate and non-certificate pupils, are negative on both aspiration measures. The one exception to this almost absolute trend is Group 5, whose achievement is not significantly

different from the Mean Achievement Index for non-certificate pupils, despite negative aspirations and working-class parentage. They are a small group numbering 46, diluted somewhat by the inclusion of seven pupils of positive pupil aspiration, and do not represent a serious reversal of the trend.

Conclusion

In terms of an educational survey in its own right, we profess by this chapter's analysis to have justified overall interest in non-intellectual factors. While we have employed one index of attainment viz. CTF, and indicated its fair prognostic relevance, we have also stressed its predictive limitations. Parental occupation, the common survey index of socio-economic class, has been placed in reasonable perspective, as having some bearing on O Grade attainment, especially perhaps for some minorities, but not having at all per se, the vital bearing on differential educational accessibility and attainment suggested by many educational sociologists, and, in our experience as College lecturers, often erroneously assumed by student teachers.

We have shown the significance of parental and pupil aspiration, again in perspective, and related to other measures. No undue claims are made for aspiration in isolation, e.g. to quote an extreme, for high aspiration in the face of very low attainment. Yet we have shown here and earlier that, when compared with other measures such as socio-economic class, measures of parental and pupil aspiration are more significant concomitants of educational achievement. In considering the longitudinal process of life and education, the aspirational "**complex**" measured in our study by one multiple-choice item may be more dynamic than either a pupil average mark in a term of yearly examination, or than a composite assessment based on a variety of "diagnostic-elements". (26).

Finally, we are aware of the limitations of our study. The arbitrary dichotomising of certain variables has been indicated. We planned to include peers as "significant others" but found that no easy measure of "mean peer attitude" was obtainable. Peer-groups are significant in the formation of adolescent attitudes and aspirations, as both Hargreaves and Coleman have elaborated (20, 21). Thus any carefully pre-planned future study of aspirations as they bear on attainment would include a measure of peer-aspiration also. The fact that our analysis stands without such a measure reflects the fact (22) that peer-group influence is **not**, as has been assumed by many, the single major influence, (23).

Perhaps the main strength of this analysis is that various variables were assessed in relation to one another, a process designed to prevent undue emphasis on any one educational factor in isolation. This plan of our broad survey reflected a selection of many variables representing at least a cross-section of the complex human nature of children and their schooling.

CHAPTER 6

A DETACHED STATISTICAL ANALYSIS OF THE RESEARCH DATA

In this chapter, a completely detached analysis of data is presented, although initially such a task seemed impossible, both in terms of size and complexity.

Basis for Inclusion of Variables

The analysis was limited to the 21 variables listed in Appendix 3, on the following grounds:–

(i) Certain variables were excluded, because of insufficient data on all sample pupils. In other words, their inclusion would have involved serious further attenuation of sample.

(ii) Two variables were excluded because of major overlap. Order in family obviously shows a great correlation with number of siblings, especially when both are translated into dichotomised scales, and was removed. Similarly estimates of books in home, given by pupils and parents, correlate highly, and only the parents' estimates were retained.

Details of the dichotomising of the variables and the statistical method employed are contained in Appendix 3. This analysis produced a series of relatively homogeneous groups.

Whereas in the analysis in Chapter 5, the variables were chosen subjectively, the analysis in this chapter involved a detached statistical selection.

Tables 37 and 38 below show the groups which emerged. It is notable that Course Allocation, Teachers' Forecast and Pupil and Parental aspiration reveal themselves as important variables in the selection of homogeneous groups. In other words, the analysis here provides some justification for the selection of these variables in Chapter 5.

Note:– 1. In the analysis in this Chapter the English, Arithmetic and French forecast ratings are treated as separate variables i.e. the combined Teacher Forecast rating is not employed.

2. The criterion variable i.e. O Grade results was not used in the derivation of these groups. The proportional pass was calculated after the groups emerged.

TABLE 37: Descriptions and Differential O Grade Achievement Indices for Non-Certificate or "COURSE-" Pupils.

NON-CERTIFICATE (COURSE-) PUPILS

Group	Number in Group	Number of Passes	Achievement Index	Description of Group
A	350	9	0.03	EF-, PUP ASP-, GIRL, SEL, TV-
B	88	4	0.05	EF-, PUP ASP-, GIRL, SEL, TV+
C	291	8	0.03	EF-, PUP ASP-, GIRL, OMN
D	410	8	0.02	EF-, PUP ASP-, BOY, SEL
E	397	3	0.01	EF-, PUP ASP-, BOY, OMN
F	274	54	0.20	EF-, PUP ASP+, GIRL
G	395	84	0.21	EF-, PUP ASP+, BOY
H	264	95	0.36	EF+, PAR ASP-
I	96	62	0.65	EF+, PAR ASP+
Total "COURSE-" Sub-Sample	2565	327	0.13	

Abbreviations:

EF	English Forecast	TV	Quality of T.V. Viewing
OMN	Omnibus School	PAR ASP	Parental Aspiration
SEL	Selective School	PUP ASP	Pupil Aspiration

Horizontal lines cut off groups into "clusters", whose O Grade performances are not significantly different e.g. A and E are not different but both differ from F.

TABLE 38: Descriptions and Differential O Grade Achievement Indices for Non-Certificate or "COURSE+" Pupils.

CERTIFICATE (COURSE+) PUPILS

Group	Number in Group	Number of Passes	Achievement Index	Description of Group
J	208	61	0.29	PAR ASP-, EF-, GIRL
K	170	71	0.42	APR ASP-, EF-, BOY
L	253	144	0.57	PAR ASP-, EF+, GIRL, SEL
P	28	16	0.57	PAR ASP+, FF+, OMN, AF-
M	68	40	0.59	PAR ASP-, EF+, GIRL, OMN
N	223	160	0.72	PAR ASP-, EF+, BOY
O	253	203	0.80	APR ASP+, FF-, SEL
T	119	99	0.83	PAR ASP+, FF+, SEL, SOC EC-, SS
S	245	208	0.85	PAR ASP+, FF+, SEL, SOC EC+, LS, BOY
Q	97	85	0.88	PAR ASP+, FF-, OMN, AF+
R	254	232	0.91	PAR ASP+, FF+, SEL, SOC EC-, LS, GIRL
U	119	111	0.93	PAR ASP+, FF+, SEL, SOC EC+, HWK-
Y	182	171	0.94	PAR ASP+, FF+, OMN, SS
V	219	212	0.97	PAR ASP+, FF+, SEL, SOC EC+, HWK+
W	33	32	0.97	PAR ASP+, FF+, OMN, LS, BKS-
X	182	177	0.97	PAR ASP+, FF+, OMN, LS, BKS+
Total "COURSE+" Sub-Sample	2153	2022	0.76	

Abbreviations:

AF	:	Arithmetic Forecast	BKS	:	Parental Estimate of Books in Home
EF	:	English Forecast	HWK	:	Hours of Homework (pupil)
FF	:	French Forecast	PAR ASP	:	Parental Aspiration
LS	:	Large School	SOC EC	:	Socio-economic background
SS	:	Small School	SEL	:	Selective School
			OMN	:	Omnibus School

Horizontal lines cut off groups into "clusters", whose O Grade performance is not significantly different. Groups joined by a vertical bracket are not significantly different, e.g. O and Q are not significantly different, Q and V are significantly different.

Non-Certificate Course Pupil Groups

Non-certificate course allocation results, naturally, in an overall low Achievement Index of 0.13. However, although the individual groups differ in composition and description from the particular groups described in Chapter 5, a similar wide range of Achievement Index is revealed.

1. "Low Chance" Non-Certificate Groups

Groups A, B, C, D and E are all characterised by achievement indices of 0.05 or less. They may in terms of their transfer allocation to non-certificate courses be said to have achieved according to expectation and allocation. All these groups are characterised by negative English forecasts at 2nd Year, often presumably accompanied by similar forecasts in Arithmetic and French. They also are all characterised by negative pupil aspiration, and in many cases possibly also by similar parental aspiration.

The broad category of "Low Chance Achievers" is more or less evenly spread over 3 or 4 year secondary and 6 year omnibus schools, although the majority of the very few O Grade Achieving girls are seen to have attended 3 or 4 year secondary schools.

2. "Fair-Chance" Non-Certificate Groups

Groups F and G, differentiated in description only by sex, are interesting in that, despite non-certificate course allocation and negative English forecasts, they attain Achievement Indices of 0.20 and 0.21, i.e. somewhat above the Achievement Index mean of 0.13 for all non-certificate pupils. Their distinguishing descriptive characteristic is Positive Pupil Aspiration, accompanied possibly in many cases by Positive Parental Aspiration.

3. "Better Chance" Non-Certificate Pupils

Group H with an Achievement Index of 0.36 has more achieving pupils numerically (95) than any other single non-certificate group in Table 37. They are characterised by positive English forecasts, and probably other subject forecasts too, but by negative Parental aspiration. While this group seem to furnish an argument for the validity of "High" forecasts, irrespective of negative Parental aspiration, a comparison with Group I reveals something different.

4. Group I

This group of 96 pupils, mixed by sex, is unique as a group in almost attaining the mean Achievement Index for Certificate pupils (0.65 compared with 0.76). They have positive subject forecasts, in English definitely, and probably in other subjects too, and are characterised by "High" Parental aspiration, and often presumably by "High" Pupil aspiration too. Compared with Group H, their distinguishing feature of "High" aspiration correlates with almost double O Grade chances.

Certificate Course Pupil Groups

Again, as in Chapter 5, this analysis reveals several relatively homogeneous groups differing very significantly from the mean Achievement Index of 0.76. In Table 38, while lines separate groups and clusters within the Groups J - N range, certain groups, such as Group Q, and Groups U and Y, may be considered as belonging to the cluster either below or above their respective positions, as indicated by the overlapping bracketed lines in the Table.

1. "Poor Chance" Certificate Pupils

In view of certificate course allocation at transfer, the achievement indices for Groups J and K are surprisingly low, although not nearly as abysmally low as that for the "Certificate Deprived" Group described in Chapter 5. Both groups are characterised by negative forecasts and low parental, and possibly pupil, aspirations, a combination which places even certificate pupils, and particularly girls, to judge by Group J, at high risk in terms of O Grade achievement.

2. "Mediocre Chance" Certificate Pupils

Groups L, P and M show slightly better than "even chances", with achievement indices still well below par for certificate pupils. (All < 0.60 versus mean of 0.76.) It is notable that all these pupils have positive English forecasts, while all but the 28 in Group P have negative parental, and possibly pupil, aspirations. This "Mediocre Chance" cluster are predominantly female, the exceptions again being the 82 boys in Group P, whose "Low Arithmetic Forecast" might represent a mixed second year attainment, possibly somewhat counterbalancing their positive Parental aspiration.

3. "Average Chance" Male Certificate Achievers

Group N, consisting of 223 boys, perform only slightly below the mean Achievement Index for Certificate pupils. They have "High" English forecasts, and possibly other subject forecasts, but negative Parental aspiration. Their achievement must be assumed to reflect the validity of second year subject forecasts, more than the usually more damaging low Parental aspiration.

4. "Good Chance" Certificate Achievers

Groups O, J, S, and Q are included in this "cluster", all achieving significantly above the mean for certificate pupils. They all have the benefit of "High" Parental aspiration. Those with positive French, and possibly other-subject forecasts, do not suffer unduly from their working class or "SOC EC" parentage. They are predominantly pupils from "selective" schools, i.e. from 6 year H - Course "academies", the exception being Group Q from omnibus 6 year schools. The negative French forecasts representing Group Q, may safely be said to be counteracted somewhat by positive Arithmetic forecasts, as this is the only instance in Tables 37 and 38 where two subject forecasts have not proved "mutually exclusive". It is noteworthy, however, that for both Groups Q and O, positive aspiration coupled with Certificate Course allocation of course, and by "6 year selective" school placement in case of the larger Group O, have combined to overcome, in terms of above average Achievement Index, the low French forecasts at second year level.

5. "Excellent Chance" Certificate Pupils

We have included pupils in Groups R, U, Y, V, W and X in this "cluster", because they are all characterised by Achievement Indices in the range 0.91 - 0.97. Such pupils seem to represent, in O Grade attainment, the opposite pole from "Low Chance" Non-certificate Pupils, although these are minority exceptions at both ends

of the scale. The fact that they are certificate pupils does not alone explain their high achievement indices. They all benefit from high Parental aspiration, and from high French forecasts, with no indication of any counterbalancing low subject forecast. As indicated, they are fairly proportionately distributed over 6 year selective and 6 year omnibus schools, such differential school organisation making little difference to their high-percentage O Grade achievement. Of the three groups differentiated by Parental occupation, two, viz. Groups U and V, are uniformly children of professional parents. On the other hand, the uniform "Low" socio-economic categorisation of Group R does not evidently detract much from their "excellent chances".

The Measures which differentiate Groups in terms of O Grade Achievement

(a) Obviously course allocation is the major differentiator of Certificate Chances, in terms of differential mean Achievement Indices for Non-certificate and Certificate pupils. Yet the groups differing very significantly from these means, both Non-certificate and Certificate groups, reveal either that course allocation has been inappropriately applied to certain sizeable minority groups, or that certain other measures either relatively hinder or enhance certificate chances.

(b) All "Poor-chance" non-certificate pupils show negative English forecast, and negative Pupil aspiration, that interacting constellation of "negatives" evidently operating to seal the predicted "non-certificate fate" for all but 2% of this "cluster".

(c) The remaining non-certificate categories reveal that, for our sample, O Grade chances were enhanced above the average if either English forecast or Pupil aspiration was positive, while for the 96 non-certificate pupils with both high forecasts and high personal certificate aspirations, such a positive combination of attributes guaranteed O Grade success for 62% of their number, in spite of their initial non-certificate stereotype.

(d) For certificate pupils, also, a combination of negative attainment and negative Parental aspiration places groups thus characterised at severe certificate risk, in spite of their initial certificate-course "sponsoring". Such a negative combination seems particularly damaging to certificate-course girls, to judge by the 71% O Grade failure of Group J.

(e) Where either second year attainment or Parental aspiration is positive, such pupils have at least "even certificate chances", although their Achievement Index is still well below the certificate-pupil mean. Negative Parental aspiration, with positive subject forecast, is seen as less damaging to boys, to judge by Group N, whose Achievement Index is only slightly short of the certificate mean.

(f) "Good Chance" and "Excellent Chance" certificate Pupils are all characterised by high Parental aspiration. Within the lower reaches of above-mean certificate attainment, such Parental aspiration, presumably usually in combination with "academic-course stereotype", seems to have compensated for certain negative forecasts characterising groups such as O and possibly Q.

(g) "Excellent Chance" certificate pupil groups are characterised by uniformly high Parental aspiration and French forecasts, and furnish striking evidence of the power of the combination of "High" Course, "High" Aspiration and "High" Forecasts (or 2nd Year Attainment) to generate "certificate chances" well beyond 9 out of 10, and for the top groups at 97 out of 100.

(h) Various measures show low concomitance with differential O Grade success. Parental occupation, the usual socio-economic index, reveals itself only in the description of 4 of the 25 groups, further reinforcement of its placement well down the variables "league table", as indicated in Chapter 4.

(i) As reported earlier, no significant difference by sex has been shown for the whole sample in terms of O Grade attainment. Yet the emergence in the present analysis of certain groups, homogeneous by sex, and their description and achievement index revealed in Tables 37 and 38, make comment on certain categories of boys and girls possible.

(i) Girls predominate among the exceedingly small proportions of "Poor Chance Non-Certificate Pupils", as earlier defined, who do in fact attain O Grades. This comment is based, however, on extremely small numbers, statistically not significant.

(ii) Certificate girls, with both low forecasts and low parental aspirations, have only 29 chances in 100 of gaining O Grades, as distinct from similar boys, who have 42 chances in 100.

(iii) Certificate boys with positive forecasts, but low parental aspirations for them, are less at risk in terms of "certificate chances" than similar girls. (Achievement Indices of 0.72 and 0.57 respectively.)

(iv) A comparison between Groups S and R, both characterised by high aspiration, high forecast, selective school of large size, but of working class parentage, reveals a slight but significant superiority of performance by girls (0.91 to 0.85). This seems to counterbalance statistically for the whole sample the male superior performances described in *(ii)* and *(iii)* above.

Conclusion on "Differentiating Measures"

Over the whole range of groups, course allocation, teacher forecasts, and pupil and/or parental aspiration are the 3 major measures within the 21 variables differentiating O Grade chances.

Of these, course allocation is the major differentiator, while measures of attainment or forecast and of parental and pupil aspiration significantly differentiate various groups of pupils within both Certificate and Non-Certificate pupil categories.

Critical Assessment of the Statistical Analysis of Homogeneous Groups

There are obvious advantages derived from the analysis, both methodologically, and in the results effected by it.

(a) The analysis of groups is purely statistical with no built-in pre-emption of variables of high educational face-validity.

(b) In the analysis, the factors, or rather the dichotomised variables emerging first are all educationally significant, and broadly in line with our findings up to this stage, while other variables of similar "educational face-validity" are shown to be less significant group-differentiators.

(c) The emerging groups have differing characteristics, and differing Achievement Indices, and form a basis for interesting comparisons and discussion. For a fuller discussion of the method of analysis see Appendix 3.

CHAPTER 7

TYPE OF SCHOOL AND 'O GRADE' SUCCESS

In this chapter, we ask the specific question, "Do pupils in omnibus schools perform better than their counterparts in the separate junior and senior secondary schools?"

It was not possible to use all the schools in the present study in the attempt to throw light on this issue. In the case of one complete local authority, the organisation of secondary schools was not conveniently divided into the two different types of school organisation. In a second authority there were, at the beginning of the investigation, no schools which could be loosely described as omnibus. In addition, one fee-paying school in one of the remaining local authorities areas was excluded on the grounds that it was liable to contain pupils from both "omnibus" and "selective" areas.

TABLE 39: Sample Schools and Pupils

		Number of Schools	Number of Pupils
GROUP 1	Senior Secondary Schools	4	741
	4-Year Secondary Schools	9	1273
GROUP 2	Omnibus Schools	6	944
	TOTAL	19	2958

We are left with 19 schools containing almost 3,000 pupils. All these pupils are members of the investigatiom sample of 5,218. Of the thirteen schools which fell into the first category, four were senior secondary schools which contain only pupils who have been selected for at least O Grade courses, although the majority were thought to be of Higher Grade ability. The remaining 9 schools were secondary schools whose population was largely regarded as lacking in certificate ability although a minority had been placed in "O Grade classes".

The schools in the second group, 6 in number, can broadly be described as multilateral or omnibus. None of these schools could strictly be called comprehensive since in every case these schools, although catering for a full ability range, contained nevertheless various forms of streaming similar to that which obtained in the other secondary schools which make up the sub-sample of schools for this area of the study. As the investigation proceeded some of the senior and junior secondary schools became comprehensive in the lower reaches of the school and many of the schools in both groups introduced common courses. None of these rearrangements, however, directly affected any of the pupils in our sample.

For the sake of convenience and brevity, the schools in Group 1 and Group 2 will be referred to as the binary and omnibus groups respectively.

TABLE 40: Numbers and Percentages in each type of course in the two groups.

		Higher Course	Ordinary Course	Non-Certificate	Total
GROUP 1	Senior Secondary	689 (93%)	52 (07%)	–	741 (100%)
	4 Year Secondary	13 (01%)	369 (29%)	891 (70%)	1273 (100%)
	TOTAL BINARY	702 (35%)	421 (21%)	891 (44%)	2014 (100%)
GROUP 2	TOTAL OMNIBUS	341 (37%)	185 (20%)	394 (43%)	920 (100%)

As the Table 40 above reveals, the proportion of pupils in each of the three courses, higher, ordinary and non-certificate, is approximately the same for each of the two groups. The thirteen pupils in the 4-Year Secondary schools, described as Higher course material, are pupils who according to the selection procedure were judged to be of that calibre but had decided to take shorter courses.

The schools in the omnibus group are more representative of the Scottish tradition in education than the "typical" modern comprehensive school built in a new town or new housing estate in an existing town or city. Only one of the six schools in the study fitted this latter description. The remaining five schools are well established, high schools which are typically found in medium sized towns throughout Scotland. However, none of the omnibus schools in the sample are the result of an artificial amalgamation of two or three schools which were at some distance from each other, nor are any of the schools, omnibus or otherwise, large even by British standards, the population of the largest being around 1300 at the time of the study. Further, because the proportion of fee paying schools in this part of Scotland is rather low, there is undoubtedly less "creaming off" of comprehensive schools as described by Pedley (24). In fact, one such

school admits less than 3% of all pupils from its catchment area. There is no evidence of a disproportionate number of pupils from one school type being educated in this school.

For a valid comparison to be made between the groups, we decided to adopt a similar type of analysis to that used in Chapter 4 (i.e. socio-economic class x course allocation), but also including the extraction of V. R. Q. since even when the first two variables are extracted V. R. Q. has been shown to be still a potent variable. The tables are kept in as simple a form as possible by dichotomising each of the three variables as follows:–

		Dichotomy	
(a)	Course Allocation	(i)	Certificate (Higher and O Grade)
		(ii)	Non-certificate
(b)	Socio-economic Class	(i)	Professional (Registrar-General's I and II)
		(ii)	Non-professional (all others)
(c)	V. R. Q.	(i)	High (100 and above)
		(ii)	Low (below 100)

These divisions resulted in 8 cells within each of which a comparison between the two groups was made. The numbers falling into each of these cells is as follows:–

TABLE 41: Total Numbers in each cell.

		V.R.Q. HIGH		V.R.Q. LOW		
		Professional	Non-Professional	Professional	Non-Professional	TOTAL
Certificate	Omnibus	148	309	19	50	526
	Binary	232	784	14	93	1123
Non-Certificate	Omnibus	9	72	35	278	394
	Binary	28	273	35	555	891
TOTAL		417	1438	103	976	2934

The table shows that the samples within six of these cells are large enough for meaningful comparisons, the exceptions being the V.R.Q. High/Professional/Non-certificate and the V.R.Q. Low/Professional/Certificate cells where the numbers are 9, 28 and 19, 14 respectively. (For the full tabulated analysis see Appendix 4.)

The following data were used – Pupil certificate aspiration, Parental certificate aspiration for pupil, the three subject forecasts, number of O Grades passed and type of certificate obtained. Most variables were dichotomised as nearly as possible to a 50/50 division. Aspirational measures were divided into certificate and non-certificate aspiration, and type of certificate into Good Certificate, as defined in Chapter 2, versus other certificates and no passes.

Results: All the detailed tables are included in Appendix 4. The tables concerning O Grade performance are included below.

1. Certificate Course Pupils

For these pupils there are no differences between the pupils of both systems with respect to pupil certificate aspiration and parental certificate aspiration for pupils. Teachers of pupils in the binary group rate their pupils' chances as higher than teachers in the omnibus schools. This trend is significant for children of non-professional parents.

As far as the number of O Grades gained (see Table 42 below) is concerned, there is no difference between the systems. However, in the case of the number of good certificates gained (see Table 43 below), there is one significant difference (.05) out of a possible of 4. This was for the high V.R.Q./Professional group where more significantly Good Certificates were gained by the omnibus group. This trend is not supported entirely in the other three comparisons for Good Certificates.

TABLE 42: Mean number of O Grades gained (certificate course pupils).

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non-Professional	Professional	Non-Professional	Unweighted Mean
Omnibus	4.89	3.10	2.16	1.38	2.88
Binary	4.79	3.31	2.79	1.22	3.03

TABLE 43: Percentage of Good Certificates gained (certificate course pupils).

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non-Professional	Professional	Non-Professional	Unweighted Mean
Omnibus	61%]*	28%	16%	10%	28.8%
	47%]	26%	29%	4%	26.5%

(* significant at .05 level. Chi-square = 6.90.)

2. Non-certificate Course Pupils

In every case there is no difference between the omnibus and binary groups as far as both pupil and parental certificate aspiration is concerned.

In three out of the 12 analyses involving teacher forecasts, the binary group are rated more highly. This is in the same area as the significant findings in the case of the certificate course pupils.

For both O Grades gained and the percentage of Good Certificates gained there is no difference between the groups. (See Tables 44 and 45 below.)

TABLE 44: Mean Number of O Grades gained (non-certificate course pupils).

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non-Professional	Professional	Non-Professional	Unweighted Mean
Omnibus	1.11	0.58	0.23	0.12	0.51
Binary	1.14	0.63	0.20	0.20	0.54

TABLE 45: Percentage of Good Certificates gained (non-certificate course pupils).

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non-Professional	Professional	Non-Professional	Unweighted Mean
Omnibus	11%	0%	3%	0%	3.5%
Binary	4%	0%	1%	0%	1.3%

Discussion

In view of the general negative nature of the findings, i.e. no significant overall difference in certificate achievement between cross-sectional samples of pupils allocated to (a) omnibus schools and (b) 4 year secondary/6 year senior secondary schools, lengthy comment seems unnecessary. It must, of course, be stressed yet again that no omnibus school in the sample operated, for our sample, a common course policy over the sample's early secondary years. Indeed, all pupils were "streamed", on the basis of secondary course allocation, into classes or courses either firmly leading to O Grade, or into classes or courses **not** leading to O Grade presentation. Thus the evidence, and conclusions, relate to a comparison between a unitary (i.e. omnibus) and a binary (i.e. senior secondary/junior secondary) system, with many similar features of internal organisation.

Arguments regarding the advantages, in terms of educational opportunity, of 'omnibus' schools, must relate to "openness" of the sytem for "borderline" pupils or "late-developing" "non-academic" pupils, where it has been argued that such pupils find themselves at least within a "presenting" school, and thus amenable to fairly simple internal "re-routing", whenever unexpected, or hitherto latent potential manifests itself. By contrast, it has been argued, such initially "rejected" pupils may find no opportunity for exploiting potential evidenced after entry to secondary, in "non-academic" or "non-certificate" schools.

As the data indicate (Table 45) equivalent minority percentages of pupils initially categorised as "non-certificate" do, in fact, sit and pass O Grade examinations both within "omnibus" schools, and within 4 year secondaries. In circumstances of such "relative openness", some organisational features may reveal further the comparability, in terms of certificate opportunity, of both "omnibus" and "senior secondary/junior secondary" systems.

(a) 4 year secondaries, i.e. the "creamed" component of the binary system, developed from 3 year Junior Secondary schools, since 1962, and directly in response to demand for O Grade presentation. Such schools have developed O Grade courses, including a foreign language in many instances, for pupils formerly considered "non-S.C.E. material". Furthermore, as O Grade presentations enhanced both school and staff status, a fair proportion of organisational and teaching effort has been devoted to this "new"

(i.e. post-1962) dimension of their work, with "certificate encouragement" being furnished, both for their "good" of "top stream" pupils, and certainly for some other pupils developing beyond initial expectation.

(b) Two balancing features of streamed "omnibus" schools, perhaps not adequately documented generally, and not investigated in our present study, are nevertheless deemed worthy of our admittedly somewhat subjective comment.

(i) In many omnibus schools, including some with initial fine-streaming, the end of the second year has become a stage for pupil decision on future course subjects, (possible career, etc.,) and some re-grouping or re-classification of pupils. Typically, for instance, as an unpublished but circulated postscript to the Preliminary O Grade Investigation (1) revealed, parents visit the school for consultation at this stage. Two organisational features, commonly practised but perhaps inadequately publicised, are noteworthy. In an endeavour to obtain fairer or more "objective" assessment, common examinations have been employed in most subjects over a fair cross-section of the school, i.e. for all pupils except those following distinctly "non-academic" courses. Then, because of the number of O Grade subjects and the consequent variety of group and individual-pupil programmes involved from 3rd Year on, some relatively radical re-grouping of pupils, in classes and particularly by "subject sets" occurs. It is likely that most of the initially "non-academic" pupils in omnibus schools who actually sit O Grades, are "re-mustered" at this stage.

The catalyst of such organisational changes has undoubtedly been the increasing range of O Grade examinations, with corresponding increased courses offered in 6 year schools. While Circular 600 (25) was mandatory, one of Her Majesty's Inspectors was heard to speculate whether, in fact, the impact of O Grades had not been a su tler, and more effective means of internal reorganisation than overt governmental prescription, inevitably giving rise to emotional reaction, might be. We would suggest that the post-second-year reorganisation described above (and, incidentally not inlike the "Ruthven Report's" (26) suggestions for "post-Common-Course" reorganisation) has already rendered the firm and sometimes fine categorisation on entry somewhat outmoded and inappropriate.

(ii) Paradoxically, perhaps, certain omnibus schools have over recent years boasted of the attainments, in O Grade passes, of individual pupils firmly categorised as "non-certificate" initially, and possibly even after second year. Anecdotally, we have heard of two such pupils, not in a sample school, each gaining 8 O Grades, an attainment denied many of their peers with initial Higher O Grade course placement. We do suggest, however, as a further evidence of similarity between the "omnibus" and "binary"systems, that in omnibus schools too, as in 4 year secondaries, certain teachers of relatively "low-status" streams or groups may seek and gain status by some slight "certificate-salvage" work among stereotyped "non-academic" pupils.

In conclusion, some general balanced comments on the "openness" of the system(s) seem appropriate. As indicated by our data 13% of pupils initially categorised as "non-certificate" actually gained O Grades. We have suggested, for both organisational systems, internal mechanisms whereby course-reallocation might occur. Where for rural areas pupil-transfer is essentially involved organisationally, we have evidence of pupil transfer from composite "primary-cum-4 year secondary" schools at as many as 3 stages, viz. at 12 for "academic" pupils, at 14 for additional O Grade candidates, and at 16, for pupils who, having remained in the local secondary and taken O Grades, proceed then to the central 6 year secondary to attempt S.C.E. "Highers". It can thus be seen that a system which differentiated pupils at transfer stage, sometimes by school placement, almost always by stream placement, and virtually always by initial course allocation, in terms of Higher, O Grade and non-certificate courses, nevertheless operates somewhat humanely and flexibly for certain pupils who, in terms of certificate achievement, transcend initial categorisation.

On the other hand, complacency with the evolving organisation described above is hardly warranted. The significant minorities attaining O Grade success, as it were "against the current" of initial streaming or categorisation, indicate both a superfluity of initial differentiation, and the possibility of more pupils who might have attained O Grade passes, within those initially graded "non-certificate". Certainly, at any rate, some reorganisation of first-year classes seems desirable, organisationally as well as in the individual pupil's interests. As numbers and percentages of S.C.E. O Grade candidates increase to 50% and more of the school population, Scottish secondary schools inevitably move radically away from traditional proportions of non-academic and academic pupils. A fair professional consensus in favour of "common-course" reorganisation seems to exist. We suggest that it may well reflect a developing organisational adjustment to continually expanding certificate opportunity and achievement, themselves reflections of a reasonably pupil-oriented school ethos. Unfortunately, in view of the timing of our investigation, we are unable to comment objectively on the operation, in terms of certificate attainment, of a more thoroughly "comprehensive" system, i.e. one embodying common courses at the early secondary stage.

CHAPTER 8

NUMBER, EXPERIENCE AND QUALIFICATIONS OF TEACHERS RELATED TO 'O GRADE' SUCCESS

This area of the investigation was strongly supported by the teacher members of the research committee. We are aware that the variables chosen for study are perhaps not those that would have been chosen if a group of psychologists had decided to investigate the same area. Such an investigation would undoubtedly have used more refined measures of the teacher derived perhaps from teacher attitude inventories, analyses of classroom teaching style, etc. The application of such measures, however, to a large group of teachers would have had its problems. Certain members of the committee felt that some measure of "teacher quality" provided by the head teacher should be collected but this was also thought to be inadvisable since it violated the principle of anonymity. Accordingly we limited ourselves to rather broad categories of experience and qualifications as our measures.

1. Teacher Form

A coding system was devised so that the teachers could be kept anonymous, if the school desired. Beside each of these codes the qualification of the teacher were entered e.g. MA (Hons) History Chapter V and the teacher's amount of experience. This level of experience was coded into broad bands viz.

I in 1st year of teaching.
II 2 - 4 years of teaching.
III 5 - 7 years of teaching.
IV more than 7 years of teaching.

2. Pupil Form

A 10% subsample of the original 6,336 pupils was selected from the school lists by taking every tenth pupil from the sample. Since the school lists were presented to us either in alphabetic order for the whole year or in alphabetic order within classes listed by stream, it was felt that a reasonable cross-sectional sample of pupils would be selected.

Data were collected in the sample Pupils' third year which meant that data for the first two years were collected retrospectively. These retrospective data were checked against school time-tables and informally where possible. Additional data were collected for the fourth school year if the pupil concerned was still at school.

3. The Sample

Unfortunately this area of the investigation was most affected by null responses. Many representatives found the task overwhelming and asked to be excused from this part of the study. This appeared to happen largely in schools with a rapid staff changeover and high percentage of unqualified teachers. In other words where survey data are quoted, they probably present a rather 'rosier' picture than actually is the case.

In fact, 30 of the 60 schools sent in sufficient data for the staffing survey as Table 46 below shows:

TABLE 46: Number of schools of each type contributing to the staffing survey.

	3 Year	4 Year	Omnibus	6 Year	Total
Number of schools in each type	19	20	11	10	60
Number of schools sending in complete data	13	6	4	7	30
Number of sub-sample pupils in each type of school	44	96	54	86	280

As can be seen the schools which did not submit staff returns are mainly 4-year and omnibus, the former probably having the most difficult staffing position and the latter as a group being only a little better. The more stable rural 3 year schools and the 6 year selective schools are well represented.

Although the total number of pupils is less than 50% of the expected 630+, they do represent some 2,800 pupils. For example, where it is indicated that 15 pupils have had only honours graduates for history teachers, it can be taken that approximately 150 pupils had this experience.

4. Coding

NUMBER OF TEACHERS:

It was decided to present the data in two **different forms:–**

(a) the number of **different** teachers per subject experienced by each pupil over the three years **S1,** S2 and S3.

(b) the average number of different teachers per year over the three year period.

EXPERIENCE OF TEACHERS:

Where a pupil had had only one teacher for a particular subject categorising could have easily been done using the four points of the scale described earlier. However, as the majority of pupils experienced more than one teacher, certain pupil amalgam categories had to be formed subjectively, according to the following rules.

(a) Inexperienced – (category 1 only), or (2 only), or (1 and 2), or (1, 2 and 3). E.g. if a pupil experienced only teachers of category 1 (in first year of teaching), and category 2 experience (2 - 4 years teaching), then the pupil was placed in this category.

(b) Fairly experienced – (category 3 only), or (1, 2 and 4), or (1, 2, 3 and 4), or (1, 3, 3).

(c) Reasonably experienced – (categories 3 and 4).

(d) Well experienced – (category 4 only).

QUALIFICATIONS OF TEACHERS:

Again allowance had to be made for a variety of teachers experienced by any pupil, viz:–

(a) Honours graduate (certificated) only.

(b) Graduate (certificated) only.

(c) Certificated and uncertificated.

(d) Uncertificated only.

SURVEY FINDINGS

(All the detailed tables for this section are contained in Appendix 5 [a].)

1. Number of teachers experienced by sample pupils

This measure shows a wide range from only one teacher over the three year period to nine teachers. This latter number was experienced by 8 sample pupils in 3 subjects French, Technical and Homecraft.

The mean number experienced ranged from 1.93 in the case of Geography to 3.90 in the case of Technical Subjects. The figure for Technical Subjects is inflated, however, by the system adopted in many schools of having as many as three divisions of Technical Subjects taken by three different teachers. Thus Technical Subjects are to some extent in an artificially high position.

What was perhaps surprising was the position of English as the second worst subject as far as number of teachers was concerned – with a mean of 3.15. In view of the shortages in Mathematics and Science it had been expected that these subjects would have produced the highest means. In fact, Arithmetic and Mathematics with means of 2.45 and 2.39 were in the middle of the table. French (2.86) was next to English with Physics (2.84) just more stably staffed. Science (in the case of schools which did not differentiate the branches of the subject) had a mean of 2.56, Chemistry 2.44 and Biology, the second lowest of all the subjects, with 2.06.

As far as the second measure of this variable was concerned, 10 subjects out of the 14 examined had some pupils who experienced an **average** of more than 2.5 teachers per annum. Again worst in this category were Technical Subjects with almost a third having experienced this situation. In view of the remarks made earlier, it is difficult to estimate to what extent this is accident (i.e. shortage of teachers) and to what extent it is design (it was the intention of the schools to provide 3 teachers per annum). French again occurred near the top of the table with 7% in the category of 2.5+ teachers per annum, and Art and Homecraft come next with 5% and 4% respectively. No pupils in Mathematics, Arithmetic, Latin and Chemistry fell into this category.

These figures mask the variation in the different types of school. For example if we take the percentage experiencing more than 1.5 teachers per annum, (to be in this category a pupil would have to experience **at least** 4 teacher **changes** in the three year period), we find that in Science 27% of 3 year school pupils,

45% in 4 year schools, 5% in omnibus schools and none in 6 year selective schools had this sort of experience. In French more than half the pupils in 4 year schools were affected in this way whereas the figure for 6 year selective schools is 16%.

2. Experience of Teachers

The proportion of pupils taken only by well experienced teachers varied from just over one-fifth in the case of Physics and French to almost a half in the case of Latin. Chemistry with just under a quarter also fell at the low end of this scale. Since General Science was next lowest, it was fairly obvious that the scientific subjects were taken by a less experienced staff than other subjects with the exception of French.

Variation was noted in the level of experience of the teachers of the sample pupils in the different types of school. Again in the case of science one of the widest variations was to be seen. Taking teachers of "above-average experience" (categories 3 and 4), over two thirds of pupils in 3 year schools were taught by such teachers, whereas less than one third of those in 4 year schools were so accommodated. In Technical Subjects **all** the pupils in omnibus schools were taught by teachers of "above average experience" whereas just over two thirds of those in 4 year schools were likewise treated.

3. Qualifications of Teachers

The percentage of pupils experiencing **only** honours graduates ranged from 95% in the case of Latin to 9% and 10% in the cases of Arithmetic and Mathematics respectively. Thus it is only in this area that the shortage of well qualified mathematics teachers shows itself. The percentages for Physics and Chemistry, 37% and 62% respectively, are rather higher than might have been expected in view of the fairly rapid turnover in these subjects noted earlier, but it should be pointed out that only in the case of omnibus and 6 year selective schools was the differentiation into the branches of science made. Where the 3 year and 4 year schools are included under General Science the proportion taught by Honours Graduates is only 16%. At the other end of the scale, in six of the academic subjects out of eleven, there were pupils who experienced **nothing but** uncertificated teachers. The worst subject was Science with almost a tenth of pupils falling into this category. The other subjects with a similarly unfavourable staffing position were English, Arithmetic, Mathematics, History and Geography.

In the case of the three practical and/or aesthetic subjects surveyed, only Homecraft had a sizeable proportion of pupils who experienced teachers of low qualifications. As far as Art and Technical Subjects were concerned such teachers were almost unknown.

Again 4 year schools have the poorest record. Less than 10% have had "honours graduates only" in Science compared with 3 year schools, in which a quarter of pupils had teachers of such high qualifications. In English, Arithmetic and Mathematics no pupils in a 4 year school had "honours graduates only", whereas in the 6 year selective schools the percentages were 40%, 29% and 29% respectively. No pupil in a 4 year school had only honours graduates for History; yet in both omnibus and 6 year selective schools over half the pupils in the sample had this experience. Only a third of the pupils in 4 year schools had **never** been taught by an uncertificated teacher in Science, and just less than half those who studied French were similarly affected. Even pupils in 6 year selective schools experienced uncertificated teachers in English, Arithmetic, Mathematics, Geography, French and Physics.

4. Summary

As has already been mentioned, this was in all probability an above average sample. Yet the survey revealed wide variations in teachers' qualifications and experience both across subjects and across types of school. In view of the biased nature of the sample, the picture, particularly in the 4 year schools, was far from optimal. However, the phased withdrawal of uncertificated teachers, the improvement in supply of graduates and the changeover to a comprehensive system are all features which will by now have altered the position.

The Relationship of Numbers, Qualification and Experience with O Grade Success

In view of the incomplete data, we decided to limit the study of these variables to six of the more popular subjects, viz. English, Arithmetic, Mathematics, French, Physics and Chemistry, and also to certificate pupils only.

Using the sub-samples as indicators of the staff position in the 17 schools (6 four year, 4 omnibus and 7

six year) which contributed to this part of the investigation, each department in each of the schools was classified as either low or high for number, experience and qualification. For the purposes of this categorisation the data concerning the fourth (presentation) year of the sample pupils was also included. Since this year is of crucial importance, the ratings of the departments were made with a weighting in favour of this year over each of the other three years i.e. the fourth year was given the same weight as the other three years combined.

It could also be argued that schools which had pupils of higher ability would tend to attract more experienced and better qualified staff, and therefore if a relationship was found between any of the variables and pass/fail at O Grade, it could be attributed to this tendency. To counteract this, two separate analyses and categorisations were made. The first refers to certificate pupils whose V.R.Q's were above 110 (the high ability group) and the second to those whose V.R.Q'S were equal to or less than 110 (the low ability group).

The pupil experience of each department in each school was categorised twice into high or low for number, experience and qualification, once for the high ability pupils (where applicable – 6 schools had none who fell into this category) and once for low ability pupils (all schools had such pupils). Therefore in one case, the comparison concerns top stream pupils in 6 year selective schools and omnibus schools and in the other, the lower streams of 6 year selective schools, the lower certificate streams of omnibus schools and all certificate pupils in 4 year schools. Thus, for example, it is possible for a department in, say, one omnibus school to be rated "low" as far as qualifications are concerned for the high ability group, but to obtain a "high" rating for the low ability group.

All pupils in the 17 schools, whose V.R.Q's were known and who had not transferred to another school either within or outwith the sample schools were included. Their V.R.Q's placed them in either the top ability or low ability group according to the division mentioned above. The only exception to this was that all pupils in 4 year schools were classified as lower ability even though some V.R.Q's were in excess of 110. This was because no pupil with a V.R.Q. above 110 appeared in the sub-sample and in any case fewer than 20 such pupils occurred in the 4 year schools which contributed. Pupils who left school before the "O" Grade examinations were deemed to have failed in the subjects being analysed.

Results

For each of the 6 subjects, the three variables, number, experience and qualifications were compared with the O Grade results in each subject. Table 47 below shows the results of these comparisons. A more detailed version of this table is contained in Appendix 5 (b).

TABLE 47 (a): Description of Superior Groups (i.e. Better O Grade Performance) in terms of Turnover, Experience and Qualifications of Teachers.

LOW ABILITY GROUP (V.R.Q's < 110)

	Number of Teachers (i.e. Turnover)	Experience of Teachers	Qualifications of Teachers
English	–	Less Experienced*	Better Qualified**
French	Fewer Teachers**	–	Better Qualified**
Arithmetic	–	–	Better Qualified**
Mathematics	Fewer Teachers**	Less Experienced**	Better Qualified**
Physics	Fewer Teachers**	–	Better Qualified**
Chemistry	Fewer Teachers**	More Experienced*	–

* Chi-Square significant at 0.05 level.
** Chi-Square significant at 0.01 level.

TABLE 47 (b): Description of Superior Groups (i.e. Better O Grade Performance) in terms of Turnover, Experience, and Qualifications of Teachers.

HIGH ABILITY GROUP (V.R.Q's > 110)

	Number of Teachers (i.e. Turnover)	Experience of Teachers	Qualifications of Teachers
English	Fewer Teachers**	–	Better Qualified**
French	Fewer Teachers**	More Experienced**	Better Qualified**
Arithmetic	–	Less Experienced*	–
Mathematics	Fewer Teachers**	Less Experienced**	Better Qualified**
Physics	Fewer Teachers**	More Experienced**	Better Qualified**
Chemistry	–	More Experienced**	–

* Chi-Square significant at 0.05 level.
** Chi-Square significant at 0.01 level.

A brief word of explanation is, perhaps, required for Tables 47(a) and 47(b). Where a blank is included, this means that the two groups being compared (e.g. more teachers/fewer teachers) do not differ significantly. For example in table 47(a) for the English group "less experienced" is found in the "Experience of teachers" column. This means that the group of pupils taught by teachers of less experience gained more passes than those taught by teachers with more experience.

In general the tables indicate that two of the three variables, number and qualification, show a greater degree of concomitance with O Grade success than the third variable, experience. Although experience is significantly related in eight cases out of a possible of twelve with O Grade success, in four of the cases, English (low ability), Arithmetic (low ability), and Maths (low and high ability), the relationship is not in the predicted direction, i.e. those taught by less experienced teachers are more successful in these four cases. Nor can these unpredicted relationships be explained in terms of the teachers in the less experienced group being better qualified and fewer in number than those in the more experienced group, since in the case of Arithmetic, for example, the two groups are equally well qualified and have a similar turnover.

Since the majority of pupils in the sample schools sat the alternative syllabus examinations in Mathematics and Arithmetic, a convenient explanation for the better performance of those taught by less experienced teachers might be that the new mathematics was biased in the direction of those teachers freshly out of university and teacher training!

Unfortunately for this explanation of the results, English which does not have an alternative syllabus showed tendencies in the same direction and in the cases of Physics and Chemistry which do have alternative syllabuses, teachers with greater experience produced significantly more passes.

Since the sample was not as big as we had hoped, we are unable to analyse these three variables, independently. In other words although both qualifications and number are on the whole significantly related with O Grade success in the predicted direction, we are unable to say whether either of these variables, independent of the other, is so related.

Three further points have to be made:–

(i) The survey section of this chapter suggested that we have a sample which is biased towards the more favourable extreme. Therefore it is a reasonable assumption to make that, if the sample had been complete, the tendencies shown above would have been more marked. Our scale probably stops short of the unfavourable extreme.

(ii) In view of the wide measures employed and taking into account the various qualifications mentioned above, it is interesting that two of the measures, number of teachers experienced and qualifications of teachers experienced, are so significantly related to O Grade success in almost every subject.

(iii) One might be tempted to suggest that, because teacher qualifications, for example, correlated positively with pupil O Grade success, the success was caused by the teacher qualifications. This would go beyond the data. Other subtler teacher variables e.g. personality, vocation, related to success and teacher qualifications may explain the findings. This does not, however, preclude the possibility that high teacher qualifications per se are determinants of success.

CHAPTER 9

THE RESEARCH IN PROCESS

1. School Participation in Research

From its outset, this research project was planned by a Research Committee consisting of Headmasters, school representatives and college staff. All secondary schools, in the area, both "local authority" and "fee-paying", were involved, the only exceptions being "private" schools presenting for English rather than Scottish certificate examinations. While certain schools and areas stopped short of completion of all dimensions of the survey, elements of attitude-survey and of staffing details proving most difficult, certain other schools contributed more than the supply of basic data, particulary in such necessary matters as trial runs of questionnaires, and standardisation of the substitute attitude questionnaire.

Involvement in the deliberations of the Investigation Research Committee and its various 'ad hoc' sub-committees meant for many Headmasters and school representatives frequent meetings and consultations, usually outwith school hours. While representatives varied in their participation in committees, all schools participated at some stage of committee work. All this work was done voluntarily, and without it, the Research would have been impossible, in terms of lack of basic data, direction, and inspiration.

In assessing school involvement, as described, certain facilitating factors, certain difficulties and certain outstanding research responsibilities require emphasis.

FACILITATING FACTORS

(i) Sustained school involvement occured, we believe, only because it was, to a major and real extent, a Schools research. Headmasters and representatives were involved in research direction, and decision-making, as well as in supplying information.

(ii) College staff had also a part to play in maintaining research, both by appropriate liaison wherever possible, and also by collaborating in information collection, when the school found difficulty in arranging this.

(iii) Furthermore, there is no doubt that school members of research committee were motivated by the opportunity of involvement in research, the results of which were likely to be of direct relevance to secondary education.

DIFFICULTIES EXPERIENCED BY SCHOOLS

There were several difficulties, indicated by Headmasters during informal discussion:

(i) Imposition of Several Simultaneous Researches

Several head-teachers reported requests for research assistance from a variety of official bodies, threatening 'in toto' to interrupt school work excessively. We are grateful that no school 'opted out' of our research on this account, but recognise that any research involvement in any school must be seen as a privilege.

(ii) Research Involvement beyond Original Intended Commitment

At least two headmasters have stated that the total commitment, in time, work, and pupil involvement, exceeded initial expectation. Obviously, there is an onus on researchers to present at the outset as full and accurate a picture as is possible of the envisaged school commitment to a research project. On the other hand, all the additional elements of the survey in process were advanced and authorised by the research committee, which included head teachers.

(iii) Preservation of Pupil and School Anonymity

Various headmasters had reservations about revealing "profiles" for individual pupils. Thus, where requested, code-numbers were used instead of names. Furthermore, we trust that all schools have been satisfied with the confidentiality of College processing arrangements.

RESEARCH OBLIGATIONS TO SCHOOLS

It seems reasonable to question what schools might expect in return for sustained involvement in research. Nor, in view of the fact that several of our school headmasters and representatives were fully aware of the general methodology of research, and of the limitations of research findings, does such a question imply

that schools, to be involved, look to research for facile solutions to their educational problems. Schools became involved in our research for reasons ranging from genuine interest in such a project, to professional courtesy of a type which must induce many headmasters to co-operate in educational projects, which are obviously important to their promoters.

It seems therefore that schools might expect courteous treatment involving at least the following elements:–

(i) A full statement of probable school involvement at the outset, including estimates of extra, as yet undetermined, chores likely to emerge.

(ii) Where possible, oppotunity for democratic involvement in research policy. We are aware that researchers' theoretical interests may dictate areas of investigation different from the interests of school staff, and that within the "democratic process" of a Research Committee, embracing College staff and school representatives, compromises are required both from school members and from College staff. Yet the process of this school-oriented investigation has revealed, in school headmasters and representatives, a rich source of information on data-collecting procedures, and on areas requiring research. The high percentages of returns, and in particular the 91% return of parental forms would not have been achieved without full school involvement.

If educational research, at present being expanded and co-ordinated in Scotland, is to be relevant, and its results communicable, researchers cannot afford to ignore the important contribution of responsible, experienced teachers.

COMMUNICATION OF RESEARCH RESULTS

Participant school members are in an excellent position to demand clear, plain statement of results. Indeed one representative, commenting on the draft report, wrote:

"The crux of the entire scheme was the involvement of staff at school level. Those so involved will probably read the report with interest but for the average classroom teacher not so committed, the report will make heavy reading. The report was probably never intended for such a readership, but if the main points from it are not more readily accessible to the class teacher, the cry may again go up, 'What's the use of research to US?' Had you considered a simplified summary even if only for distribution to the schools that took part?"

It seems necessary to communicate results much more briefly and simply than we have done in these pages, to accommodate large numbers of teachers who find formal reports tedious. We have fulfilled our obligation to teachers by writing a much briefer, less statistical version.

2. A Longitudinal Study

In general two features seem desirable for a school-oriented longitudinal investigation, however much the present investigation lacked them:–

(i) Sustained school contact over the entire period, implying periodic "research bulletins" right up until the final report.

(ii) Prompt results, both for the benefit of participant schools, and for educationists generally.

3. Collection of Data

Within the context of a large-scale multi-variable research, we wish to comment on the feasibility and economy of questionnaires without belittling their validity.

(i) Acceptability of Measures

All the measures figuring in the research analysis were feasible in that they were completed by a majority of sample pupils. The Parent's Questionnaire, (and in particular the optional section on books in the home, working mother) proved acceptable. We are certain that, in this instance, the "optional clause" yielded a higher percentage completion than its omission would have secured for the entire questionnaire. The Richardson Attitude to Teachers Questionnaire, a valuable measure per se, was much less acceptable in that many schools and areas refused to administer it. The Substitute Attitude to School Questionnaire, although inferior in terms of pre-standardisation was accepted by one education authority which had rejected the former inventory.

The matter of viability becomes increasingly important as research tends away from "academic-intellectual" measures linked with pupil performance towards "personal-affective" measures involving school,

home and parents. Greater acceptability may be secured by stressing optional completion in areas of semi-private information, and by presenting "innocuous" items, where affective reactions are being measured.

(ii) Economy of Measures

Economy is an important consideration in terms of research budgeting for time and money and in terms of teachers' time. Items on Pupils' Forms (Appendix 1) and Parents' Forms (Appendix 1) relating to academic and vocational aspirations obviously represent economic measures. Attitude questionnaires figure towards the opposite pole of the scale of economy, in that College staff administered them in almost all schools.

We do not, of course, suggest that uneconomic measures have no place in survey research. We do, however, state firmly that **overall**, economy is necessary, and that heightened economy is possible with planning and forethought. For example, we feel that an affective measure of the Substitute Attitude Questionnaire type could easily have been appended to both Pupils' Forms and Parents' Forms (Appendix 1) at the outset of the investigation.

4. Processing of Data

Computer Processing had been envisaged from an early stage of the Research Committee deliberations, when it was decided to involve a year-group population for the area in the research, in preference to a sub-sample. Coding of data from questionnaires and returns was a manual task, involving much time-consuming work.

The ideal situation with firm pre-planning, firm information on the availability of computer, and automated ancillary "hardware" for data processing, was denied us. For future surveys of this kind, however, we would strongly recommend the use of pre-coded responses on questionnaires, electronic sorting of responses by scanners, and, in short, the automation of the entire process betwenn the return of raw data in completed questionnaire form to the transfer to computer disc or tape of the entire survey data.

5. Computer Analysis of Data

In fact, considerable time elapsed before the survey data were firmly on magnetic tape at Dundee University Computer Laboratory. We had earlier transferred our material from St. Andrews University, purely because of the convenient proximity of Dundee facilities. Our data posed problems of coding, and programming for computer experts, which were solved in process, the computer facilities themselves developing over the period of the research.

With the exception of the analysis presented in Chapter 6, however, the bulk of the analyses in this report was actually programmed by one of the authors. If educational research teams wish to retain some functional control over the planning, processing, and computer programming of research investigations, it seems essential to employ "Education-research-computer" experts. This statement has obvious implications for the training and employment of future educational research workers.

CHAPTER 10

THE MAIN FINDINGS AND SOME EDUCATIONAL INFERENCES

1. The Sample

The original sample of 6336 represented a complete cross-section of second-year pupils for Angus, Clackmannan, Dundee and Perthshire. The Investigation sample of 5218 was found to be slightly superior to the original sample on certificate aspiration, school subject forecasts, in measured V.R.Q., and in O Grade results. The mean family size was also slightly, but significantly, smaller. Despite this slight superiority on a minority of indices, the Investigation sample may be taken as educationally representative.

2. The Measures Used

While we make no rash claim to have included all the significant measures we might have used, the measures were chosen by a large group of responsible educationists, and they embrace both traditional measures of intelligence and attainment and several measures of pupil background. Certain measures of attitude and aspiration were also employed. All these measures were obtained economically (at least as far as the Investigation is concerned), and without undue intrusion on pupil or parental time.

Our measures have all shown wide distribution, and reasonable expected correlation with firmer conventional measures, such as V.R.Q. and socio-economic class. Beyond this, all of the measures have face validity, (i.e. they are seen to measure what they claim to measure), and educational relevance. This does not mean, however, that the measures are either orthogonal (independent of each other) or similar in "inferred breadth".

The criterion measure of O Grade results may seem unimaginative, in that there are other indices of school success or failure, but our remit was to study examination performance. There are more significant justifications, however, for distinguishing pupils by achievement into "no O Grades" and "one or more O Grades". Nowadays, over two out of every five pupils fall into the latter category, as our survey and S.E.D. statistics for the whole of Scotland show. Furthermore, in terms of "certificate" and "non-certificate" course allocation, some surprising exceptional groups of pupils emerge.

Finally, the use of a variety of measures has enabled us to put single indices in perspective, a practice which might have saved many well-known researches from highlighting "significant relationships" as "educationally important", or, by implication, "of paramount educational importance".

3. Which of our Measures correlate most with O Grade Results?

(i) **"Intellectual Factors"**: Table 23 shows that Course Allocation, i.e. entering "certificate courses" or "non-certificate courses", correlates most with "getting O Grades", or "not getting O Grades". Similarly, teachers' forecasts, based on pupils' performance at the end of second year, predict only to a certain extent the later O Grade performance of pupils. V.R.Q's derived when the pupils are in Primary 6 and 7 also furnish some prediction of their O Grade "behaviour" four or five years later. All these findings are in line with well-established research findings, and therefore expected.

(ii) **Socio-economic Class**: The placement of Socio-economic Class mid-way in Table 23 seems a most significant finding. This global index, i.e. a measure with assumed great "supposed breadth" has loomed large in writings of educational sociologists, and indeed in official reports, over the past decade or more. It can be argued that parental occupation is not an adequate measure of the broad constellation of differential material standards, life-style, attitudes etc. associated with differential socio-economic class. We can omly state that it is the measure most commonly employed in survey research.

It is significant, therefore, that we have found many "narrower" measures to correlate O Grade results than does parental occupation on the Registrar-General's scale. This indicates that socio-economic class, while correlating significantly with O Grade results, is not a **major** concomitant, and could easily be over-emphasised.

We do **not** suggest that no meaningful socio-economic differentiation exists in the homes of our sample, in terms of differential standards, life-styles, values and attitudes. Nor do we suggest that the documentation of socio-economic advantage and disadvantage furnished in the Crowther and Robbins reports (6, 9) is erroneous. Indeed the index in Table 23, and various evidences of differential attainment by socio-economic class within our report reflect some fair continuing advantage and disadvantage.

But the limited extent of such relative advantage and disadvantage relating solely to parental occupation is also emphasised in our report. In this connection it is important to stress that we are reporting

on socio-educational circumstances in 1969, i.e. many years after the Crowther "dis-advantaged" sample had their education. Thus certain basic features of the present socio-educational scene require emphasis:–

a) Living standards have improved considerably, so that smaller numbers are seriously disadvantaged in terms of residence and basic standard of living.

b) All pupils at the time of reporting these findings stay at school until at least 15 years of age, i.e. until less than one year before O Grade examinations for most. Thus taking O Grades does not represent a lengthy or serious deferral of wage-earning, even for the many children whose parents earn low wages. It is possible that greater socio-economic differential will reveal itself at higher levels of education.

c) Our overall analysis of socio-economic class, as it affects a cross-section of pupils, does not discount the possibility of "pockets" of relatively disadvantaged pupils, in terms of O Grade chances. Where our analysis has described such disadvantaged groups, however, it must be stressed that "working class" itself always appears as part of a negative cluster of variables. Likewise, where "working class" appears as the only "negative" measure in a cluster of otherwise positive measures, it does not unduly depress O Grade chances.

The limitations of a socio-economic class as an educational index can be emphasised even more, however. This supposedly global index lacks specific face-validity, and contributes little to an understanding of probable cause-effect relationships in secondary pupil performance. Higher proportions of professional parents' children and lower proportions of semi-skilled parents' children do well in O Grades. Such a statement does not clarify causes and effects, but may suggest over-simplified and over-generalised causal links. We see the task of discovering and assessing more specific and face-valid concomitants of educational success as an important one for research and trust that our present investigation has gone a small way in this direction.

We see this relative "debunking" of socio-economic class as a major educational factor as something having important implications in the school world. While we are confident that many Scottish teachers have a healthy respect for working-class children, we feel that different reactions have sometimes been reinforced, in fact if unintentionally, by recent emphasis, by sociologists and in official reports on socio-economic differential. Certainly, as College of Education lecturers, we know that many students derive an exaggerated notion of class-cleavage in relation to life-styles and educability, amounting almost to a "Middle-class good/working-class bad" attitude. Such attitudes could be dangerous in school and class-room, especially in an era of increasing democratisation of full secondary education. Our evidence is that, while working-class parentage in combination with other negative circumstances may be a disadvantage, working-class origins **per se** are **not** a major sole cause of O Grade non-attainment.

(iii) **Pupil and Parental Attainment**: The Investigation obtained measures of pupils' and parents' wishes in terms of taking O Grades and Highers, and in terms of future jobs or careers. Table 23 reveals a second very significant finding of this Investigation, in that all these 4 measures, i.e. certificate and job aspirations for both pupils and parents, correlate rather highly with O Grade success as compared with the other measures. Indeed Pupils' Aspiration falls just short of Course Allocation, and comes higher even than individual subject forecasts, or than V.R.Q., a fact which also serves to place these more conventional measures in perspective. We have, in the main text, indicated that a measure of pupil aspiration is so much more easily obtained than a series of subject forecasts, or a V.R.Q.!

As the various finer analyses later clarify, the desire or intention of pupils to take O Grades, and/or of parents for their children to do so, enhances very considerably pupils' chances of O Grade passes. Most pupils lacking this ambition, and having parents without it, are considerably at risk in terms of O Grade chances, even if they are classified as "certificate pupils" on transfer to secondary, and **even if they still confirm this diagnosis in the second year of Secondary schooling.**

Such findings have important educational implications. Within reasonable limits, obviously, school has a certain part to play in generating and maintaining such positive aspirations in most pupils for as long as is reasonable. Such a policy might involve avoiding stereotyping pupils as "non-certificate" for as long as possible. While such a statement may seem to suggest common courses and mixed ability groups, it does not inevitably mean this. Readers may be aware of private schools with differing streams, but with the lower streams receiving extra coaching towards certification. During the Investigation period, we became aware of several lower-stream pupils, both in 6 year and 4 year schools, who were "sponsored" towards certification.

Differential course allocation, which applied to our sample, and streaming within courses might rapidly and unnecessarily generate negative aspirations in certain pupils.

Furthermore, course content, method, and assessment all may be seen as contributing somewhat to pupils' ongoing aspirations. Here, content and method in line with the pupils' developmental level, rather than ignoring this in favour of enshrined subject standards from the outset, might guarantee present and later success, and sustained aspirations, for greater number of pupils. Such a "matching education" at secondary level, to employ J. McV. Hunt's phrase, (27), could do much to enhance pupil success. However seemingly reactionary the statement, we fell that a "matching education" does NOT mean mixed ability groups receiving convential class teaching. It would seem rather to indicate group and individual programming of work, extra coaching and encouragement for the weak, and the judicious use of flexible sets, or even occasionally of temporary "streams", assuming "non-certificate" stereotypes did not figure. Then, internal assessment might be amended in nature to guarantee a majority pass, if we wish most pupils to retain positive aspirations without necessarily diluting **ultimate** standards. We fear that pre-occupation with failing the incompetent can figure too largely in secondary educational thinking, and question the "diagnostic elements" of Ruthven (26) on this score. So often, even by the age of 14, we cannot say how a pupil is going to do. Pupil aspiration and parental aspiration appear as "prognostic elements" at the end of the second year, at least as potent as any single-subject "diagnostic elements". It is possible that many pupils, with appropriate encouragement, could beneficially continue study of subjects, such as Science, Mathematics and Foreign Language, which early harsh assessments force them to abandon by the end of second year.

Parental aspirations appear also as highly significant. While parental aspiration may be largely associated, perhaps, with circumstances unconnected with the school, such as parental education, job, and life-style, it seems more important to emphasise ways in which schools may influence such aspirations in the long term.

Where parents seriously wish their child to do O Grades and/or Highers at some future date, such parents will presumably convey to the child, directly and indirectly, notions of the importance of gaining educational certificates. Such parents may well also expect their child to attend school regularly, work conscientiously, do homework within reason, etc. In short, the measure may be said to reflect circumstances much broader than a mere wish for the future. Our analysis shows that most parents, including a majority of working-class parents, wish their children to do O Grades, although it also reveals 1510 parents with no certificate aspirations for their children.

An analysis of parental aspirations for their children at the age of 5, contrasted with those expressed by the same parents for the same children at the age of 14, would reveal changes, somewhat in accordance with the "feed-back" from the school on their children's performance. For instance, Morton-Williams Survey reported in "Plowden", (11), Volume 2, Appendix 3, reveals for England 76% of parents of 7 11 year olds wishing their offspring to stay on beyond school leaving age. Our proportion of positively aspiring parents is less than two-thirds. We would suggest that a considerable proportion of the 1510 parents who did not wish their offspring to do O Grades had different ideas before their children were firmly allocated to "non-certificate" courses at the age of twelve.

It seems obvious that parental aspirations are relatively stable in the short-term, but subject to influence by the school in the long-term. While the primary school must have responsibilities in this area, we limit present comment to secondary education:-

(a) Avoidance of distinctive overt "certificate" and "non-certificate" course allocation at the secondary transfer stage is to be recommended for the majority of pupils. On this score, "common course" policies seem likely to maintain parental aspirations of a positive nature.

(b) Within realistic limits, more positive communications to parents concerning their children might be encouraged. In this connection, we are aware of the danger of unrealistically high parental expectations for children. Nevertheless, headmasters and teachers might realise two conflicting features of the current secondary scene and adjust somewhat accordingly:-

I We are perhaps too "thirled" still to early stringent academic assessment, with the inbuilt prejudice in many individual subjects that many pupils are bound to fail.

II It is becoming increasingly "normal" for average pupils to attain O Grades. Our investigation reveals several groups who attain O Grades despite negative second-year forecasts.

III There are obviously a variety of ways of enhancing parental involvement in school affairs. We do not seek to dwell on general involvement in P.T.A.'s, school activities, etc., all of which may be beneficial enough. In connection with endeavouring to ensure and harness positive parental aspiration, it seems necessary to stress more specific elements of parent-school contact. Such contacts, by written communication and by personal visit, might undoubtedly be planned, if necessary involving many of the school staff to ensure that they occur. It seems desirable, that parents should have a private interview in school, centring on their child's progress and prospects, at least once a year.

Whereas genuine failure and serious misconduct cannot be ignored, the normal emphasis might be on positive, realistic, career-oriented prospects for the child, a recommendation which fully accords with the informed ethos of "guidance and counselling".

IV Such suggestions on involving parents dynamically relate to all secondary educational and vocational goals, and not merelt to O Grades. The suggestions obviously apply, not only to parents with expressed negative aspirations for their children, but potentially to all parents.

(iv) **Attitude to school**: Our study shows that, while "good attitude" improves "certificate chances" somewhat for all groups, it does so much more for certain categories of pupils. To put it mildly, all pupils of below average ability, in terms of Verbal Reasoning Quotient, have several times more chance of gaining O Grades, assuming their attitude to school is favourable. "Good attitude" to school more than doubles the "certificate chances" of pupils of average or slightly above average V.R.Q. At both these levels good attitude to school makes most difference, in terms of "certificate chances" to children of semi-skilled and unskilled workers, although for children with V.R.Q's below 100, whose parents are professional, chances are 11 times higher if they have good attitude to school. While the trend is maintained for pupils with V.R.Q's of 110 or more, the differential "certificate chances" are fractionally greater, rather than "several times greater". Smaller differential O Grade chances for able pupils can be explained in terms of most universal attainment of "success" in terms of our criterion, viz. one O Grade or more. Conceivably, with a higher criterion, viz. 3 Highers or more, attitude would reveal itself as an important factor for able pupils also.

We thus have shown that positive attitude to school is an important concomitant of success in O Grades, especially for those less favoured intellectually. Of course, attitude to school is, again, a broad measure, presumably influenced by home, parents, and peer-group, as well as by the school itself.

The educational implications of these findings are manifest:–

a) The way the "customers" feel about school is important, and cannot lightly be ignored. Our experience, both in this research and in other areas such as curricular development, has shown us that pupil reaction to school can be readily sampled by simple, but carefully constructed, questionnaires anonymously completed by pupils in a few minutes' time. Thus, in future, secondary schools may be expected to sample at regular intervals pupil reaction to school in general, and also to various features of the school "menu", such as new curricula, different subjects, or even guidance and counselling provision.

b) Our survey has revealed that individual schools differ widely in mean pupil attitude to school, although we have not reported such results in detail. It is reasonable to infer, therefore, that pupil attitudes to school reflect, to some extent at least features of the actual school situation as they experience it, and which pupils either like or dislike. A finding of our preliminary analysis, reported in the 1968 British Association Paper (12), revealed an inverse relationship between school size and mean pupil attitude to school, with sufficient exceptions to the rule to show that size alone was not the overt or face-valid cause of low or high attitude. This finding does suggest, however, that relatively stable and personalised human relationships may contribute to good attitude to school. If this is the case, there is much which can be done, both by establishing a good school ethos, and by developing more stable human groups organisationally. Organisationally, stability might be insured for pupils, not only by ensuring adequate guidance and counselling in accordance with recently evolved principles and organisational structure. (28). For example, block time-tabling reducing significantly the number of teachers and different peers any pupil has to interact with, will increase pupil-stability in the large-school situation, and will probably improve the pupils' attitude to school.

c) We have already stressed various features of pupil experience, conducive to good attitude to school. Perceived success and directed progress towards certificate and/or vocational goals, as well as parental involvement in pupils' education, both at home and periodically on the school premises, all seem likely to affect pupil attitudes to school and education. Beyond these features, reasonably pleasant pupil experience of work, study, sport, leisure and company at school seems likely, within reason, to contribute to positive attitude to school, and for most pupils, to improved certificate chances.

4. How do the Measures correlate with O Grade Success for Homogeneous Pupil Groups?

The analysis on Table 23 refers to the total undifferentiated sample. It could be argued that the correlations between certain non-intellectual factors and O Grade success are simply reflections of pupil ability, and differential course allocation. How do these relationships hold for homogeneous groups as, e.g. "non-certificate working-class pupils"?

The total sample was divided into four sub-samples, differing on Course Allocation and Parental Occupation. Thus for each measure four correlations were calculated, each comparing the measure (e.g. Certificate Aspiration, or Books in Home) with O Grade Results for each of the four sub-samples.

Overall, the order of measures by this procedure has roughly maintained itself. Measures of pupil and Parental aspiration have the first two ranks, i.e. now higher than individual subject forecasts. This high placing more than confirms the emphasis on aspirational measures reflected in this report.

In fact, the order is generally maintained, and the same measures are still significant.

This finding is vitally important, both for our research, and in terms of its educational implications. It justifies our procedure of studying a variety of pupil groups later. Educationally, various non-intellectual factors **per se** are related to achievement. For example, high pupil and parental aspiration enhance O Grade chances even for pupils in non-certificate courses, and of working-class parentage.

5. Pupil Groups with Differential O Grade Chances

Tables 35, 37 and 38 represent an interesting array of differential pupil groups, both in terms of group description and performance. They also confirm the importance of aspirational measures as concomitants of O Grade success and failure. Tables 37 and 38 represent no "educational-rational" pre-emption of measures for extraction. Thus, since statistically it was possible that T.V. viewing, or working mothers would show maximum correlation, it is highly significant that, beyond course allocation, measures of aspiration, either parental or pupil, become the high order bases for grouping transcending even subject-forecasts for Certificate Pupils.

In summary, two extremes may suffice to highlight differential chances of pupil groups. Table 35 reveals two categories of **non-certificate** pupils whose chances of O Grade success are both well above 50%, while the same table reveals a category of **certificate** pupils with O Grade chances as low as 5%. It must be emphasised that such pupil descriptions are based on measures all of which were obtained before the end of second year secondary.

Singly, course allocation, and teachers' forecasts based on second-year performance not unnaturally show concomitance with O Grade results, the former more than the latter. But measures of parental and pupil aspiration also show high concomitance with differential results, proving for certain groups even more potent predictors than teachers' forecasts. Professional versus working-class parentage makes some difference to O Grade chances, but per se not nearly as much as has been attributed to socio-economic class.

Overall, the pupil-group analysis reveals evidence of "good chance" and of "high risk" pupils, roughly differentiated on the following basis. Pupils may be categorised on a variety of dimensions, including course allocation, attainment ot date and forecast, pupil aspiration, parental aspiration, and parental occupation. Where any pupil or group of pupils shows "positive" or "high" on a majority of these attributes, the defect of the remaining negatives, even of course allocation or of second-year attainment, seems to be modified in terms of O Grade chances. Such pupils may be termed "good chance" pupils. On the other hand, where a group of pupils are characterised by a majority of negative features, minority advantages, even if of course allocation and second-year attainment, tend **not** to be reflected in good O Grade chances. Such pupils, ultimately characterised by negative or disappointing O Grade results, may be termed "high risk" pupils.

EDUCATIONAL IMPLICATIONS

The educational implications of our "groups" analysis require only summary statement!

I Negative course allocation, with attendant "non-certificate" stereotype, can be largely obviated by comprehensive organisation.

II Various educational measures to ensure relative success, and continuing positive pupil aspiration, seem practicable. Such measures include curricular reform, changes in assessment procedures, and emphasis on more positive "feedback" to pupils and parents.

III Parents should have a more positive and sustained involvement in their children's educational progress throughout the secondary period. Regular consultations with staff, centring on realistic, but always positive, future educational "programming" of the child seem an essential feature of such involvement.

IV Schools might early identify "high risk" pupils, and strive to remedy their attributes and prognosis.

6. Minor Factors related to O Grade Success

Several other measures which correlate positively with O Grade results, but not to any great extent, include Books in the Home, Estimates of Homework, School Estimate of Parental Support, Quality of T.V. viewing, and family size and position. To a certain extent our findings confirm earlier studies which have highlighted such measures. On the other hand, our analysis and ordering of various measures places these measures in better perspective as "significant, but not of major significance". Although there are inter-relationships between family size and aspiration, the latter is the more significant measure, almost irrespective of family

size. Few of these other measures have "face-validity" in explaining directly causes and effects in certificate success and failure. Finally, and most tellingly, the homogeneous groups generated statistically in Chapter 6 reveal very few of these measures in their "descriptions", the exceptions being books in the home and T.V. quality. Even then, such features are low-order distinguishers of groups, with little obvious bearing on differential O Grade performance.

Educationally, therefore, it is important that these measures be seen as reflecting features of a pupil's circumstances which are meaningful, perhaps, but not critical, singly at least, in relation to O Grade performance. Thus, T.V. viewing quality has not a great bearing in O Grade success, in spite of popular fears to the contrary. Books in the home may mean something as part of a composite "home" measure, as in Fraser's (8) study, but is connected with O Grade success only at the extremes of "under 25" and "over 200". In short, our table of measures reveals several much more worthy of our study than any mentioned above.

Class size, club membership, part-time work, working-mothers, sex, and school size show for our sample little or no correlation with O Grade performance. Table 30 serves to place such factors appropriately in relation to other measures. The moral of non-significance can perhaps be pointed by example. **If pupil certificate success is important**, a school might concentrate less on development of school clubs, or on encouraging pupils to join external clubs and organisations, and more on involving the pupils' parents in positively motivating their children towards certificate success. Nor does such a comparison imply that clubs are, per se, undesirable. Similarly, apart from obvious individual excesses, pupil part-time work need not concern schools too much. It seems, overall, to have little effect on O Grade chances, while lack of aspiration to get certificates can be much more damaging for a pupil.

7. Different Types of School

The types of school involved in our sample were 3 year secondary, 4 year secondary, 6 year selective, and 6 year "omnibus". The analysis contained in Chapter 7 contrasted the differentiated Senior/Junior O Grade Secondary Schools with Omnibus Secondary Schools. For the 19-school sample, to quote the report, "neither of the systems produced better O Grade results", although binary type schools rated pupils' O Grade chances more highly at second-year level, while high-V.R.Q. children of professional parents gained significantly more "Good" certificates in "omnibus" schools. We must emphasise the similarity of both types of schools, not only in O Grade results, but also in internal organisation. For our sample who entered secondary in 1965, no "common courses" operated. They typically entered not only specific "certificate" or "non-certificate" courses, but finer streams within such courses. To this extent, the secondary "programming" of pupil categories would have varied little by type of school. Omnibus schools had firm senior secondary compartments and junior secondary compartments, broadly paralleling the separate schools of the binary system. Our survey, therefore, does not at all reflect any differences between a binary system, and a genuine comprehensive organisation.

8. Staffing in Secondary Schools

Mean number of teachers of one subject experienced by sample pupils over 3 years ranged from 1.93 for Geography to 3.90 for Technical Subjects, with English next to Technical Subjects, and Arithmetic and Mathematics more stably staffed. There are suggestions that pupils in 3 year schools experienced reasonably stable staffing, those in selective schools the most stable, and those in 4 year schools the least stable.

A wide range of teacher experience was evidenced, with Physics, French and Chemistry showing less than a quarter of the teaching being done by highly experienced teachers, while over half of Latin teaching is done by highly experienced teachers. Again variation occured by type of school. For example over two-thirds of pupils in 3 year schools were taught science by teachers of "above average experience", while less than one-third of pupils in four year schools were taught science by similarly experienced teachers.

Qualifications of teachers also showed a very wide range. Thus 95% of pupils taking Latin had only honours graduates, while only 10% of pupils had their mathematics tuition from honours graduates only. In six of the 11 subjects, there were some pupils (about 500 in the case of Science) who had experienced **nothing but** uncertificated teachers.

When "teaching circumstances" are related to O Grade success (Table 47) it becomes apparent that (I) fewer teachers and (II) better qualified teachers accord with better O Grade performance, while (III) experience of teachers, defined in terms of length of service, does not appear to be so critical.

EDUCATIONAL IMPLICATIONS

I **Number of Teachers**: The number of teachers experienced by pupils must be seen, in many instances, as a reflection of turnover or instability of staff, and to this extent our findings tend to confirm the

damaging effect of such excessive turnover on pupils' O Grade chances. Our evidence strongly suggests, also , that 4 year schools were most at risk in this respect. There seems little doubt, therefore, that the standardisation of all secondary education in 6 year secondaries, accompanied by an improvement in teacher supply, could in time remedy this imbalance. Although in the short term 4 year secondaries and unattractive school areas may lose their perceived disadvantage slowly, it seems likely that reorganisation, guaranteeing a pupil population cross-section at all secondary schools, might hasten staffing "equalisation".

It seems to us that schools have an organisational responsibility to their pupils to avoid fractionating their pupils' subject learning experience more than is necessary. A sensible policy in this connection might involve guaranteeing one teacher only per subject wherever possible. Beyond this, where teachers are qualified in more than one subject, such as English and History, or Mathematics and Science, the policy of having both subjects taught to one class by the same teacher may be a sound one. We have earlier mentioned the desirability of more stabilised, personalised human relationships in secondary education. It would seem that, for certificate success as well as for personal adjustment, many pupils could benefit from rather fewer teachers per week.

II **Qualifications of Teachers:** Our evidence points to better certificate performance by pupils taught by well-qualified teachers, and especially by Honours Graduates, as opposed to teachers with poorer qualifications, and uncertificated teachers.

Since our sample experienced their secondary education, uncertificated teachers have been officially removed from the secondary scene. Nevertheless, our evidence leaves no room for complacency, in that overall qualification level varies greatly by subject. Our findings suggest the need for continuous reassessment of the state of subject-teacher supply, and presumably also the need to recruit well-qualified graduates in accordance with the differential subject-demands. Such selective recruitment, however "new" and seemingly controversial in character, would seem rational, whenever overall secondary teacher supply begins to meet demand, as it may well shortly do.

III **Experience of Teachers:** Experience of teachers was not found to influence O Grade results consistently. There is, however, more than a suggestion that experience, in years of teaching, is not as important as qualifications and turnover of teachers experienced by pupils.

GENERAL CONCLUSIONS

Although our research has possible limitations, owing to its structure as a broad survey, and to the fact that secondary schools have since undergone considerable reorganisation, it has yielded several findings of continuing educational relevance.

Several of the chosen "non-intellectual factors" are concomitants of O Grade performance. Pupil and parental aspiration, for instance, have been shown to be as meaningful, in terms of prognosis of success, as teacher forecasts and Verbal Reasoning Quotients, and more significant than broad measures of socio-economic class. In this highly complex area, our investigation may at least prove a fresh stimulus to educational interest, and future finer research.

APPENDIX 1 – Forms used in Investigation.

PUPIL'S FORM

CONFIDENTIAL – SSI/1

School..... Name or Code Number.....

1. Read the following statements and underline the one which applies to you.
   (a) I would like to leave school at the school leaving age.
   (b) I would like to stay on at school after the school leaving age.
   (c) I have not yet made up my mind.

2. Read the following statements and underline the one which applies to you.
   (a) I hope to stay on at school until I sit some Highers.
   (b) I hope to stay on at school until I sit some O Grades.
   (c) I do not intend to sit any O Grades.
   (d) I have not yet made up my mind.

3. List the subjects in which you hope to pass SCE Exams. State for each whether at Higher or Ordinary Grade.

SUBJECT	GRADE
.....	.....
.....	.....
.....	.....

4. Do you hope to carry on your education (full-time) after you leave school? Underline your Answer.
   YES DON'T KNOW NO

   If your answer is YES, underline in the following list where you intend to continue your further education.

AGRICULTURAL COLLEGE	COMMERCIAL COLLEGE	PRE-NURSING COURSE
ART COLLEGE	DOMESTIC SCIENCE COLLEGE	TECHNICAL COLLEGE
COLLEGE OF EDUCATION (Teacher Training)	MUSIC COLLEGE	UNIVERSITY

   If the place where you hope to continue your further education is not included in the above list, write it in the space below.

   .....

5. State one or more jobs you are interested in taking up when you leave school or finish your education. If you have no idea of which job you are interested in, write "Don't Know"

   .....

6. Do you have any part-time jobs at the moment? Underline your answer.
   YES NO

7. If your answer is YES to Question 6, when do you work at this job (or jobs)? Underline your answer.

   BEFORE SCHOOL AFTER SCHOOL SATURDAY SUNDAY

8. How many hours per week do you spend on your part-time jobs?

   .....

9. **How many hours per night, on average, do you spend doing your homework? Underline the number nearest to the time you spend.**

0 hrs. ½ hr. 1 hr. 1½ hrs. 2 hrs. 2½ hrs. more than 2½ hrs.

10. **Apart from School Clubs,** are you a member of a youth organisation or club such as Scouts, Guides, Cadets, Boys' Brigade, Youth Club, etc.? Underline your answer.

YES NO

If your answer is YES, which organisation do you belong to?

.....

11. Are you a member of any school clubs or societies? Underline your answer.

YES NO

If your answer is YES, which clubs or societies do you belong to?

.....

12. Here is a list of television programmes. Underline any programmes in the list that you have often watched. (If you have no television, put a tick in the space provided.)

All Our Yesterdays	(4.7)	Panorama	(6.5)
Blue Peter	(5.2)	Peyton Place	(1.4)
Cinema....	(2.6)	Sportsview, Scotsport, Grandstand...	(3.2)
Coronation Street	(1.5)	This Week	(5.8)
Crackerjack	(2.7)	Till Death Us Do Part	(1.6)
Eamonn Andrews Show	(2.3)	Tomorrow's World	(6.1)
The Man from UNCLE	(1.5)	Top of the Pops	(1.5)
The Palladium Show....	(1.5)	Twenty-Four Hours.....	(6.2)
		No Television.... ..... ☐	

13. How many books do you think there are in your house? DO NOT INCLUDE COMICS OR MAGAZINES. Underline the number nearest your guess.

0 5 23 100 150 200 More than 200

14. Here is a list of DAILY papers. Underline those that you read fairly often.

ABERDEEN PRESS & JOURNAL	DUNDEE COURIER & ADVERTISER	EVENING TIMES
DAILY EXPRESS	EVENING CITIZEN	MORNING STAR
DAILY MAIL	EVENING EXPRESS	GLASGOW HERALD
DAILY MIRROR	EVENING NEWS	GUARDIAN
DAILY RECORD	EVENING TELEGRAPH	SCOTSMAN
DAILY TELEGRAPH		LONDON TIMES

If the daily paper you read is not included in the list above, enter its name in the space below.

.....

If you do not read any papers at all put a tick here. .....

15. (a) How many older brothers and sisters do you have? .....

(b) How many younger brothers and sisters do you have? .....

PARENT FORM

CONFIDENTIAL – SSI/2

THIS INFORMATION WILL NOT BE USED BY THE SCHOOL WHEN DECIDING WHICH COURSE YOUR CHILD IS GOING TO FOLLOW. IT IS PART OF A RESEARCH PROJECT WHICH IS BEING CARRIED OUT AT DUNDEE COLLEGE OF EDUCATION. THE RESULTS OF THIS RESEARCH MAY BENEFIT FUTURE SECONDARY SCHOOL PUPILS.

The information requested here refers to your son/daughter in the second year of the Secondary School.

1. Underline the statement which applies to you.
   (a) I would like my son/daughter to leave school at the school leaving age.
   (b) I would like my son/daughter to stay on at school until he/she has obtained some O Grades.
   (c) I would like my son/daughter to stay on at school until he/she has obtained some Highers.
   (d) I have not yet made up my mind about how long my son/daughter should stay at school.

2. If you wish to comment further on Question 1, please do so.

   .....

   .....

   .....

3. Which job would you like your son/daughter to take up when he/she leaves school? If you are not sure, write "Don't Know".

   .....

4. In your opinion, how long should your son/daughter spend on homework each evening? Underline as appropriate.

   0 hrs. ½ hr. 1 hr. 1½ hrs. 2 hrs. 2½ hrs. more than 2½ hrs.

Your answers to the following questions would be extremely valuable, but if you feel that you do not wish to answer them, please leave them blank.

5. Are both parents working? Underline as appropriate. YES NO

6. Underline the approximate number of books in your home.

   0 5 25 50 100 150 200 More than 200

CONFIDENTIAL – SSI/3

School.....

Pupil	Occupation of Father or Guardian	Parental Support	Promotion V.R.Q's		Mean V.R.Q.	English Est.	English Att.	Arithmetic Est.	Arithmetic Att.	Final Promotion Mark	Course Allocation

SCE FORECAST FORM

CONFIDENTIAL – SSI/4

Subject..... **(Tick appropriate Column)**

Pupil	Definitely not O Grade Pupil	O Grade Doubtful	O Grade Possible	O Grade Definite	H Grade Possible	H Grade Definite

SCHOOL ORGANISATION FORM

SSI/5

School Organisation Relative to Pupils in Sample

Data on School Organisation relative to Sample Pupils were collected as follows:–

(a) Schools furnished information concerning the designation, and "pupil-type" of all classes in First Year Secondary for Session 1965-66, as on Table 1.

Table 1.

Session 1965-66 (1st Year for Sample)

Class	Higher Pupils	Ordinary Pupils	Non-Certificate Pupils

(b) For Sessions 1966-67, and 1967-68, schools furnished more detailed information, not only on designation of classes, but also a more detailed analysis of class composition by sex, placement by ability or achievement, if applicable, and nature of subject-curriculum, as Table 2, with appended instructions shows:–

Table 2.

Session 1966-67 (2nd Year for Sample)

Class	Sex	Placement	English	Maths or Arithmetic	History	Geography	French	Latin	Science	Technical	Domestic	REMARKS

Table 2 should be completed as follows:–

Column 1:	**Class**	Enter the names of each class on Second Year for 1966-67, again in order of decreasing academic standard where applicable.
Column 2:	**Class Composition by Sex**	1 – Male 2 – Female 3 – Mixed
Column 3:	**Placement in Class**	1 – Notice taken of attainment 2 – No notice taken of attainment. (i.e. in the comprehensive school ideal or where only 1 class in year.)
Columns 4 – 12:	**Subject Columns**	0 – Subject not taken by any member of class. 1 – Whole class taught subject as a class. 2 – Class taken in sections, e.g. science. 3 – Groups containing members of other classes. 4 – Part-Class, i.e. where some class members do not take subject e.g. Latin, Domestic Science, etc. where applicable.

(c) For Session 1967-68, i.e. the third year for the Sample, a similar analysis to that for 1966-67 was made.

PUPIL CLASS FORM

SSI/6 – (1)

Pupil's Name or Code .....

Year Subject	1st Year Class	2nd Year Class	3rd Year Class	4th Year Class	5th Year Class	6th Year Class	COMMENTS

STAFF LIST FORM

SSI/6 – (2)

TEACHER (If school so desires this column may be left blank)	CODE	QUALIFICATIONS WITH SUBJECTS	Years of Teaching						Years of Presentation – O Grade						Years of Presentation – H Grade					
			1965–66	1966–67	1967–68	1968–69	1969–70	1970–71	1971–72	1965–66	1966–67	1967–68	1968–69	1969–70	1970–71	1971–72	1965–66	1966–67	1967–68	1968–69	1969–70	1970–71	1971–72

ATTITUDE QUESTIONNAIRE (1) FORM

Confidential – SSI/7

School No. ..... Name .....

Present Class..... Code No. .....

Class or Classes you were in last year.....

Most days I find school interesting and exciting .....
I shall be glad when I am able to leave school .....
School would be all right if it weren't for the examinations.....
I quite like the things I do at school.....
I work hard at school because I enjoy it.....
I should come to school even if I didn't have to.....
School doesn't give me enough chance to think things out for myself... ...
There is too much punishment at school.....
Pupils' opinions and wishes don't count for anything at school.....
If you work at school, you get on all right.....
My education is not a good preparation for earning a living.....
I just can't wait to get away from school.....
I would play truant from school if I thought I would get away with it..
The school leaving age should be raised to 16.....
I feel that my opinion counts for something in my school.....
I am not sure whether I would like to stay on at school.....
Some mornings I wish I didn't have to go to school.....
Our school is too free and easy. People take advantage of it.....
I could do better at school if they let me work on my own.....
At this school they treat us all as if we were important people.....

ATTITUDE QUESTIONNAIRE (3) FORM

Confidential – SSI/9

School No. ..... Name .....

Present Class ..... Code No. .....

Class or Classes you were in last year .....

In the table below, 4 words are listed on the left. Along the top of the table are listed descriptions of how you might feel about school, teachers, homework and school uniform. These descriptions form a scale ranging from "Like Very Much" to "Dislike Very Much".

Opposite each word on the left, enter **one tick** in the box which best tells **how you feel about it.**

	*(5) Like very much	(4) Quite like	(3) Not sure	(2) Rather dislike	(1) Dislike very much
School					
Teachers					
Homework					

In this table, 4 words are again listed on the left. Along the top of the table are listed descriptions of how useful school, homework, etc. appear to you. The question to ask yourself for each of the words on the left is, "How useful is this to me for my future life and work?"

Then, opposite each word on the left, enter one tick in the box which best shows **how useful** it is for you.

	*(5) Very useful	(4) Quite useful	(3) Not sure	(2) No great use	(1) Absolutely no use
School					
Homework					
O Grades					

* Numbers in brackets are the numerical values for each category.
They do not appear on the actual form.

SCHOOL LEAVERS FORM

SSI/10

School: ..... School Code No.: .....

Record of School Leavers

Code No.	Name	Leaving Date	Name of Technical College	Type of Employment	Unemployed Not Known

PUPIL TRANSFERS FORM

SSI/11

PUPIL CODE NO.	LEFT	TRANSFERRED	STILL AT SCHOOL

S.C.E. ESTIMATES AND RESULTS FORM

SSI/12

School..... Session.....

Pupil's Name	Code No.	Anh.		App. Maths		Zoo.		Minority Subjects (Enter name of subject)	

Perforated tear off strip

The schools were circulated prior to the compilation of the form, in order to find out the likely number of pupils about to be presented in the various subjects at O Grade. The 33 subjects with the largest number of potential presentations were included by name in the above form, with spaces left at the right hand side for the other subjects designated minority subjects.

TABLE 1: Homogeneous group based on course allocation; socio-economic class etc.

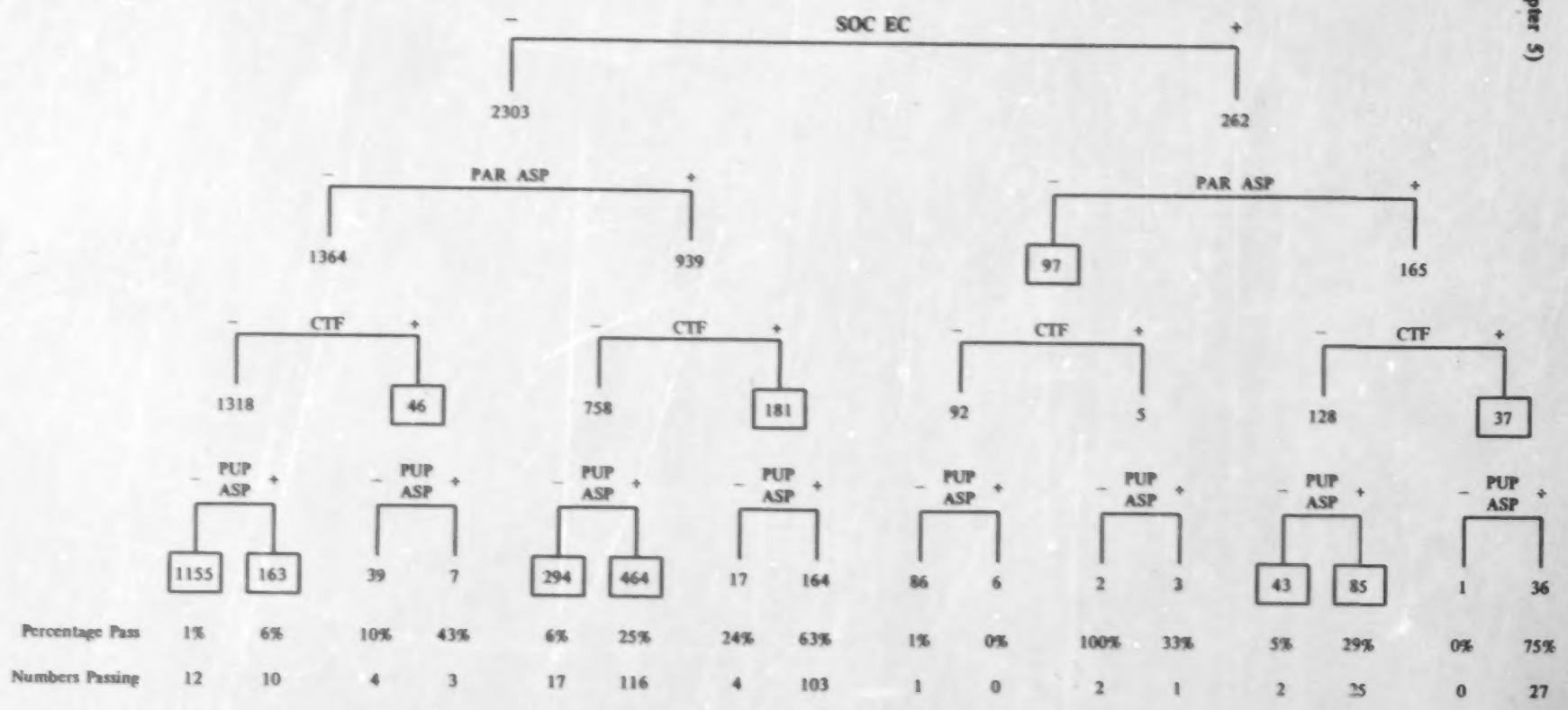
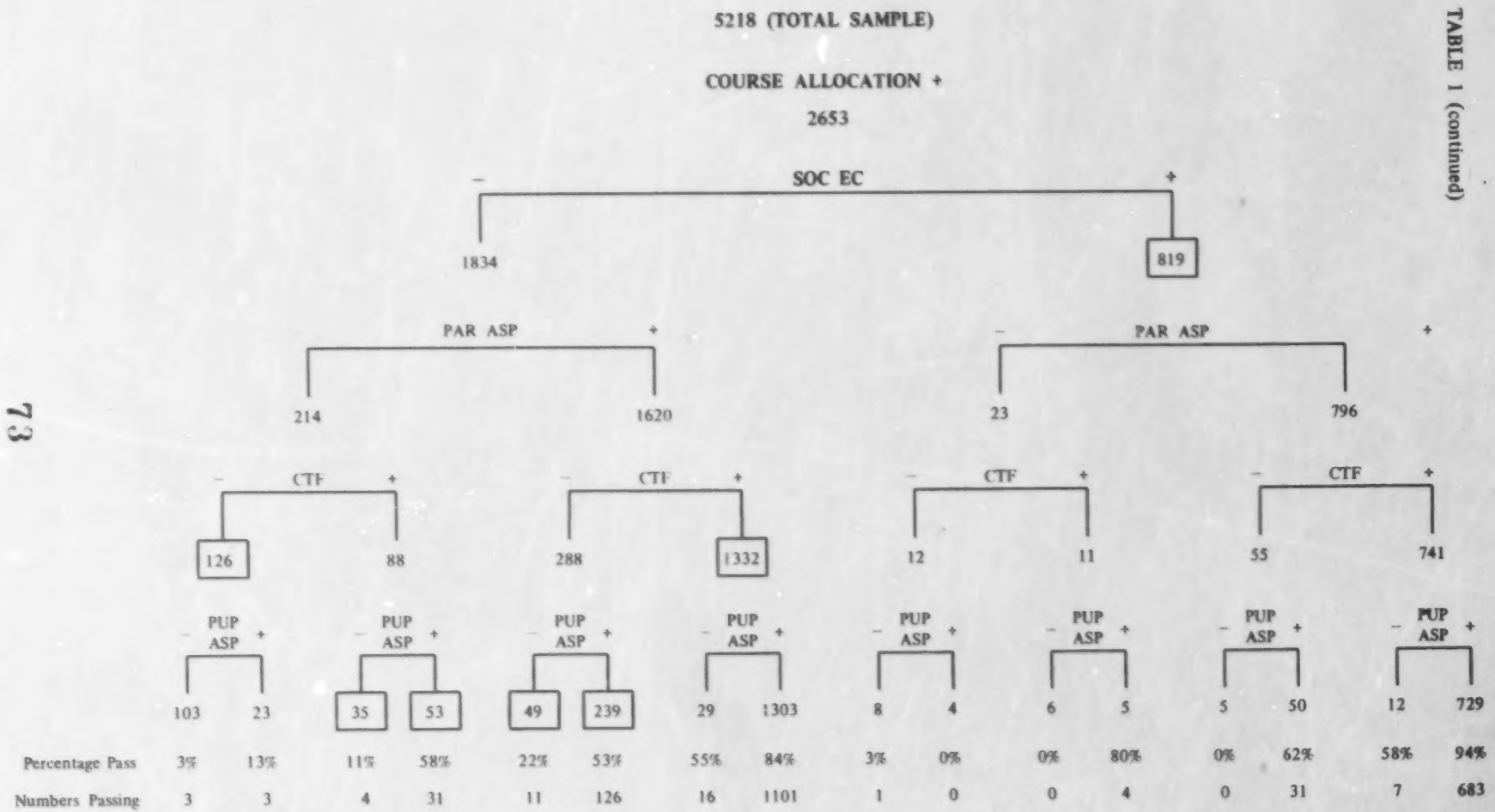


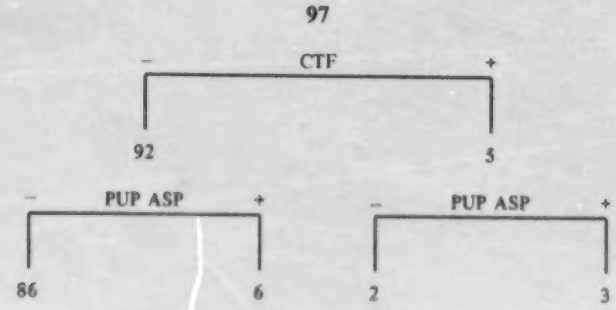
TABLE 1 (continued)



Abbreviations:

PAR ASP	Parental Aspiration
PUP ASP	Pupil Aspiration
CTF	Combined Teacher Forecast
SOC EC	Socio-economic Class

We decided to limit our analysis to groups numbering more than 30, including minorities in the majority category for the final division. The moderate extent of category dilution involved may be best explained by the category of "COURSE−, SOC EC−, PAR ASP−" pupils, numbering 97 pupils. It further subdivides thus:−



We have described the category, i.e. 97 pupils as "COURSE−, SOC EC −, PAR ASP−, (CTF−), (PUP ASP−)" i.e. treating the 5 "CTF+" pupils, and the 6 "PUP ASP+" pupils, as if they were completely similar to the 86 majority, using brackets to indicate diluted categories.

The pupil-groups, all above 30, with inclusion of minorities as illustrated, are "boxed" for easy reference in Table 1.

TABLE 2:

GROUPS IN ORDER OF DECREASING PROPORTION OF PASSES

Serial No.	Achievement Index	Number	DESCRIPTION COURSE	SOC EC	PAR ASP	CTF	PUP ASP
11.	.89	819	+	+	(+)	(+)	(+)
12.	.84	1332	+	−	+	+	+
1.	.73	37	−	+	+	(+)	(+)
2.	.59	181	−	−	+	+	(+)
13.	.58	53	+	−	−	+	+
14.	.53	239	+	−	+	−	+
3.	.29	85	−	+	+	−	+
4.	.25	464	− −	−	+	−	+
15.	.22	49	+	−	+	−	−
5.	.15	46	−	−	−	+	(+)
16.	.11	35	+	−	−	+	(+)
6.	.06	163	−	−	−	−	+
7.	.06	294	−	−	+	−	−
17.	.05	126	+	−	−	−	(−)
8.	.05	43	−	+	+	−	−
9.	.04	97	−	+	−	(−)	(−)
10.	.01	1155	−	−	−	−	−

COURSE − Course Allocation
SOC EC − Socio-economic background
PAR ASP − Parental Aspiration
CTF − Combined teacher forecast rating
PUP ASP − Pupil Aspiration

The above table includes both certificate and non-certificate course groups in order.

It also shows the degree to which the group achievement indices are differentiated statistically.

1) The two horizontal lines indicate clear divisions between the groups on either side of the line e.g. all the groups below the lower horizontal line are significantly different from all groups above this line.

$$\left(\frac{p_1 - p_2}{\sqrt{\left(\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}\right)}} > 1.98 \right)$$

2) Groups joined by an arrowed line are not significantly different from each other, e.g. the bottom three groups.

APPENDIX 3 (to Chapter 6)

STATISTICALLY DERIVED HOMOGENEOUS GROUPS

TABLE OF DICHOTOMISED VARIABLES

The reader is referred to the questionnaires in Appendix 1, and to Chapter 2, for details of the measures used for the variables listed below. The use of "High" and "Low" in Table 1 below obviously represents verbal economy, and reflects most of the bases of dichotomy, Sex and Type of School being two obvious exceptions to the rule. While, for ease of presentation, similar left-to-right order presentation of "Low" and "High" categories is maintained both in Table 1 and in the diagram "Dendogram" in this Appendix, such prior ordering of categories has no bearing on the statistical analysis.

Table 1: Dichotomised Variables

Variable	DESCRIPTION OF DICHOTOMISED CATEGORIES "High"	"Low"
1. Sex	Male	Female
2. Certificate Aspiration (Pupil)	"H" and "O"	No Certificate and "Don't Know"
3. Homework (Pupil)	$\geq$ 1 Hour	$\leq$ ½ Hour
4. School Club	Yes	No
5. Outside Club	Yes	No
6. T.V. Quality	$\geq$ 3	$<$ 3
7. T.V. Quantity	$\leq$ 7	8+
8. Siblings	$\leq$ 2	$\geq$ 3
9. Parental Occupation	R. G. Classifications I and II	R. G. Classifications III, IV and V, and Unclassified (i.e. No Father, Separated, Unemployed, etc.)
10. Certificate Aspiration (Parent)	"H" and "O"	No Certificate and "Don't Know"
11. Homework (Parent)	$\geq$ 1½ Hours	$\leq$ 1 Hour
12. Working Mother	No	Yes and Null Response
13. Books in Home (Parent)	$\geq$ 150	$\leq$ 100
14. V.R.Q.	$>$ 100	$<$ 100
15. Course Allocation	"H" and "O"	Non-Certificate and Null Response
16. English Forecast	Possible +	Doubtful –
17. Arithmetic Forecast	Possible +	Doubtful –
18. French Forecast	Doubtful +	"Definitely Not O Grade"
19. Size of Year Group	$<$ 180	$>$ 180
20. Type of School	Omnibus	6 Year Selective, 4 Year, 3 Years
21. Part-time Work	No	Yes

Purpose of Analysis:

The purpose, or function, of this procedure is to obtain, in a detached objective way, homogeneous groups.

Each group of significant size, thus obtained, can then be considered in terms of the dichotomised variables which describe it, and in terms of percentage O Grade achievement. As in Chapter 2, O Grade success is operationally defined as "Pass in 1 or more O Grades". This measure, for the present analysis, becomes the "Criterion Variable", **not** for deriving groups, but in stating for each group a "Percentage O Grade Success".

Procedure:

a) A Chi-square relationship was calculated for the sample on each of the variables listed in Table 1 in conjunction with each of the remaining 20 variables. This represents a total of 210 comparisons and calculations.

b) For each variable, a total Chi-square value was obtained, by adding the 20 results obtained for it by the above procedure. Thus, for each of the variables in Table 1, an index is obtained of the extent to which the sample is differentiated on it (i.e. each dichotomised variable) as compared with all the other variables.

c) Following the completion of this analysis, the sample is sub-divided into "High-Low" on the variable yielding the highest total Chi-square. Thus, in the present analysis, Course Allocation yielded the highest total Chi-square. Accordingly the sample was divided into "High Course Allocation" and "Low Course Allocation" sub-samples.

d) For **each** of these sub-samples, the process indicated above was repeated i.e. for each of the 20 remaining variables, i.e. with Course Allocation extracted, Chi-square comparison was carried out with each of the remaining 19 variables, and similarly 20 total Chi-squares were obtained, in order to obtain the highest total Chi-square, and further sub-divide the sub-sample on the variable involved.

e) This process of sub-division of sub-samples goes on, with each further sub-division based on the variable with maximum total Chi-square, until for any sub-sample matrix of Chi-squares, no individual Chi-square above a predetermined level of significance remains.

f) The programme was run to operate at 0.01 significance level for any individual Chi-square within a matrix. In other words, where, within a matrix of $(n-1)$ comparisons between variables for a sub-sample still undivided on n variables, one or more individual Chi-squares of 6.6 or more remained, the sub-sample was further sub-divided into "High-Low" on the variable yielding the highest total Chi-square, and a fresh analysis proceeded. Otherwise, where no significant individual Chi-square result was obtained, (at 0.01 level), the pathway analysis stopped.

g) Such an analysis generated 128 groups, identical on the variables already extracted (i.e. the basis for each prior "High-Low" sub-division), and almost so (i.e. not differentiated beyond 0,01 level of significance) on any remaining variable.

h) For purposes of the present report, the size and complexity of the "Dendogram", or diagrammatic "pathway-analysis" of 128 groups prevented reproduction in print, although interested readers are invited to apply for a photo copy to the authors. Furthermore, an analysis of 128 groups is not convenient here, both because of the small size of most of the groups, and because of the complexity of explaining and comparing and contrasting all 128!

Accordingly it was decided to employ a Chi-square criterion of 25 instead of 6.6. Such a procedure yielded 25 groups, as indicated in Table 2. Although this criterion Chi-square may seem somewhat high, important considerations beyond that of merely obtaining a convenient number of sizeable groups justify its adoption:–

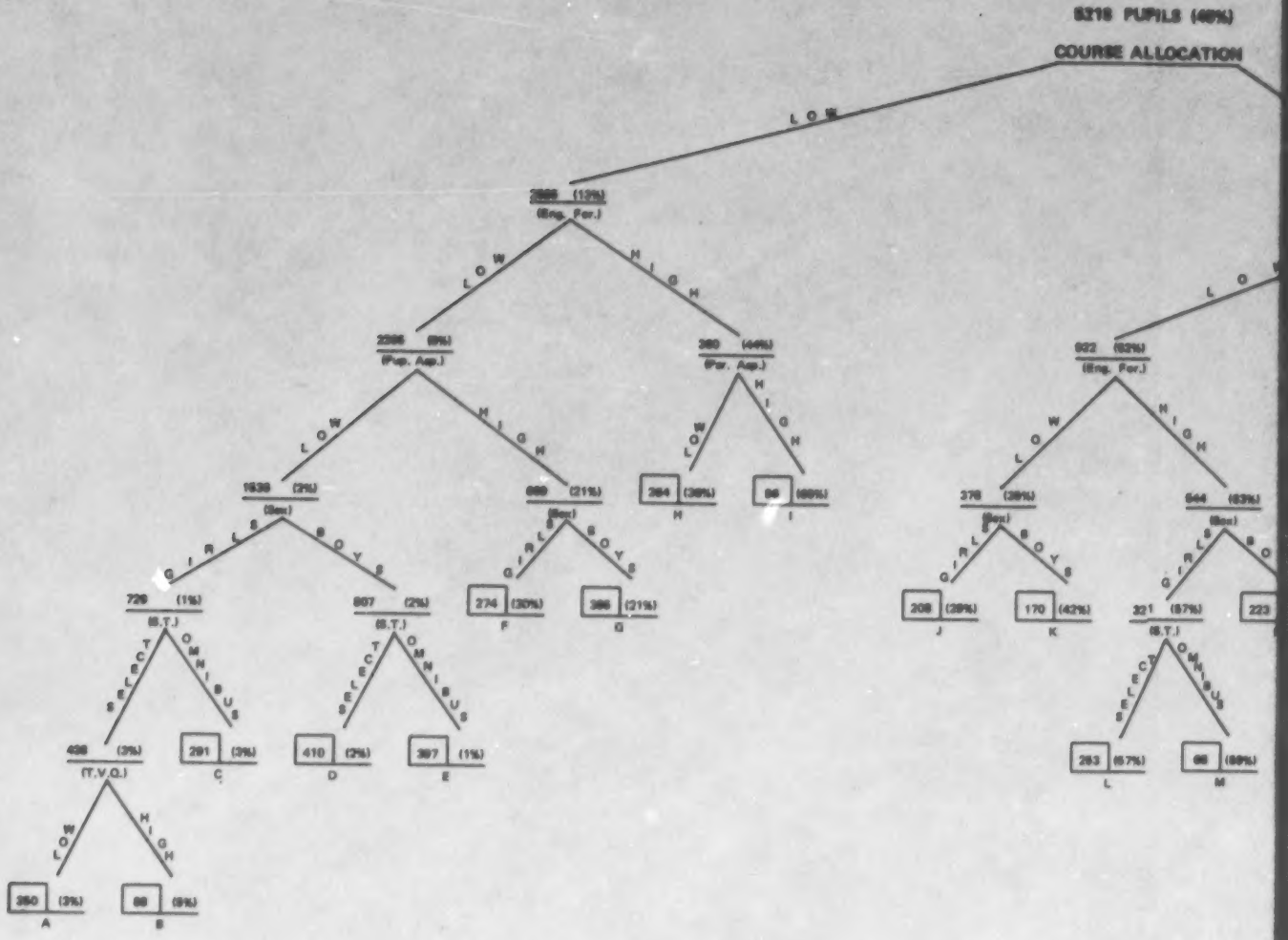
(i) The process of variable-extraction for sub-division into further groups (outlined in paragraphs a) to e) above) extracts variables in a detached rather than an educationally pre-determined way. It will become evident that the Dendrogram of 25 groups represents an adequate analysis for our purposes.

(ii) Each of the 25 groups obtained is homogeneous on a pattern of "educationally significant" variables.

(iii) The chances of having **no** individual Chi-square from an array of Chi-squares significant at 0.01 level are considerably less than 0.01. Therefore, the criterion for termination of pathway, (i.e. Chi-square=25) is probably rigorous enough.

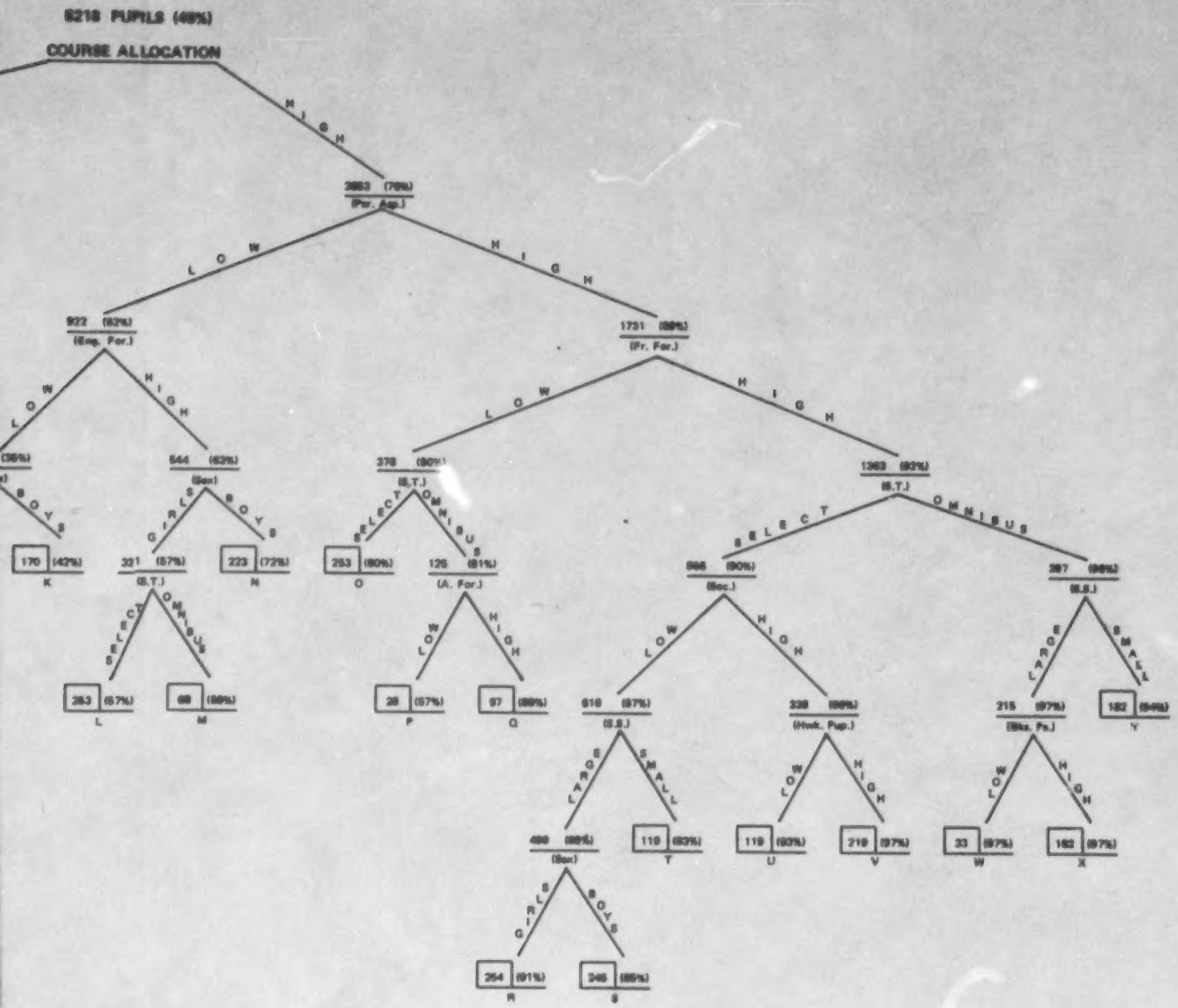
TABLE 2

DENDROGRAM SHOWING VARIABLES WHICH



Eng. For.	:	English Forecast	Fr. For.	:	French Forecast
Pup. Asp.	:	Pupil Aspiration	S.T.	:	School Type
Par. Asp.	:	Parental Aspiration	T.V.Q.	:	Television Quality
A. For.	:	Arithmetic Forecast	S.S.	:	School Size
Hwk. Pup.	:	Homework Pupil	Bks. Pa.	:	Books Parent
Soc.	:	Socio-economic Class	A – Y	:	See Tables 37 / 38

SHOWING VARIABLES WHICH WERE EXTRACTED



Results:

The emerging "high-order" variables or measures differentiating successively more homogeneous groups are:–

(i) Course Allocation (presumably also largely incorporating V.R.Q.).

(ii) For "Low Course Allocation" pupils, English Forecast, (also largely subsuming Arithmetic and French Forecasts) For "High Course Allocation" pupils, Parental Aspiration, (also largely subsuming Pupil Aspiration for the "High Course Allocation" category).

(iii) The "third-order" sub-divisions of "Low Course Allocation" pupils are by Measures of Aspiration.
The "third-order" sub-divisions of "High Course Allocation" pupils are by English and French Forecasts.

(iv) At "fourth-order" sub-division, 8 of the 10 emerging groups are homogeneous on sex.

Limitations:

There are, however, various limitations inherent in the analysis.

a) Limitations of Technique.

(i) The method of dichotomised variables involves often a compromise between distributional and educational considerations in arriving at a point for division into "+" – "–" or "High" – "Low". It will be seen, for instance, in Table 2 that a "Doubtful" Forecast places the pupil in the "High" category for French, but in the "Low" category for English and Arithmetic, an inconsistency rendered necessary by different distributions.

(ii) At a higher level of finesse, the analysis may be said to operate by reducing all variables to discrete dichotomies. While, for example, such a dichotomisation directly reflects "nature" in the case of sex, it masks both the distributional pattern of, say, V.R.Q., and prevents finer sub-division of differential categories, as e.g. V.R.Q. of 85 or less; V.R.Q. of 130+.

(iii) A more serious criticism of the method is that it artificially masks potentially important variables which overlap with variables already extracted by group-differentiation. Thus, in our case V.R.Q., as well as alternative subject-forecasts or aspirations, were all masked presumably by Course Allocation (V.R.Q.) and first-extracted aspiration or subject forecast. Although we suggest below a part-remedy for "variable masking", it must be considered a defect in the analysis, in that total composite Chi-squares are obtained in process of homogeneous-group-generation and cannot be objectively pre-hypothesised. In other words, by this process, a very significant, but overlapping variable, could be masked to point of non-appearance in group description, unknown to the researcher.

b) Limitations inherent in Present Analysis

(i) The choice of variables is perhaps arbitrary, not only in terms of the list originally decided by the Research Committee, but in terms of incomplete data discarded in order to avoid attrition of sample. Thus, potentially important measures, viz. Attitude, have been omitted.

(ii) The compromises involved in dichotomising measures have been indicated. Pre-awareness of this type of analysis in future might, perhaps, involve different measures for certain data collection.

(iii) As indicated, earlier, the choice of Chi-Square value for stopping further sub-division was arbitrary, and changed in process. It must be stressed, however, that the programme generated many more groups than we could reasonably describe and compare.

Balanced Evaluation and Suggestions for Educational Improvement

This detached statistical analysis has well served its purpose of generating homogeneous groups, and we consider its use in our research well worthwhile. We must stress that only the availability of a University statistician with computer-competence and access to modern university computer facilities render such an enormous analysis, involving several thousand concomitance analyses for a 5218 sample, at all possible.

While we are unwilling to suggest improvements of the procedure's statistical validity, we tentatively offer some suggestions for improving an educational analysis of the present type:–

(i) Masking of certain variables could be lessened by the use of more composite variables. For example, a composite measure of aspiration, i.e. Pupil's + Parental Aspiration, might have proved interesting.

We are certain, in view of different groups described in Table 35, Chapter 5, that a Composite Teachers' Forecast is preferable, and more meaningful, than a series of different subject forecasts with somewhat arbitrary "cut-off points". For instance, Table 35, Chapter 5, generates a group of "Certificate Deprived" Certificate pupils, who are somehow "lost" in the present analysis.

(ii) In any future such analysis, we feel we would employ several measures of less or nil educational face-validity. Although this statistical analysis is very different from a factor analysis, the purpose of several "different" measures may be said to parallel Cattell's use of a hyperplane of personality and other measures in his factor analysis employed to derive indices of Fluid and Crystallised Intelligence (29). In general terms, in any detached multi-variable analysis, some planned heterogeneity of classes of variables is necessary to ensure detached objectivity. More particularly, we could hardly help having groups classified on educational descriptions, when all our measures were measures paralled in previous educational research. We would claim, however, that several of the 21 measures which did not emerge in the group-generation must have served as a base or "pseudo-hyperplane".

APPENDIX 4 (to Chapter 7)

COMPARISON OF OMNIBUS AND BINARY GROUPS

A. CERTIFICATE COURSE PUPILS

1. Pupil Certificate Aspiration

Percentage aspiring to certificates

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non Professional	Professional	Non Professional	Unweighted Mean
Omnibus	93%	86%	95%	62%	84.0%
Binary	96%	90%	79%	76%	85.3%

All N.S. N.S. Not significant

2. Parental Certificate Aspiration for Pupil

Percentage aspiring to certificates

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non Professional	Professional	Non Professional	Unweighted Mean
Omnibus	95%	88%	89%	62%	83.5%
Binary	98%	90%	79%	81%	87.0%

All N.S.

3. English Forecast

	Percentage regarded definite O Grade and better				Percentage which had a chance O Grade and better				
	V.R.Q. HIGH				V.R.Q. LOW				
	Professional		Non Professional		Professional		Non Professional		Unweighted Mean
Omnibus	76%	NS	47%	**	74%	NS	69%	*	64.3%
Binary	83%		61%		71%		77%		73.0%

* significant at 0.05 level Chi-square = 4.82
** significant at 0.01 level Chi-square = 16.80

4. Arithmetic Forecast

	Percentage regarded definite O Grade and better				Percentage which had a chance O Grade and better				
	V.R.Q. HIGH				V.R.Q. LOW				
	Professional		Non Professional		Professional		Non Professional		Unweighted Mean
Omnibus	63%	NS	33%	**	58%	NS	58%	*	53.0%
Binary	71%		51%		79%		82%		70.8%

* significant at 0.05 level Chi-square = 9.38
** significant at 0.01 level Chi-square = 29.10

5. French Forecast

	Percentage regarded definite O Grade and better				Percentage which had a chance O Grade and better				
	V.R.Q. HIGH				V.R.Q. LOW				
	Professional		Non Professional		Professional		Non Professional		Unweighted Mean
Omnibus	54%	NS	28%	*	34%	NS	26%	NS	35.5%
Binary	60%		35%		42%		43%		45.0%

* significant at 0.05 level Chi-square = 6.12

B. NON-CERTIFICATE COURSE PUPILS

1. Pupil Certificate Aspiration

Percentage aspiring to certificates

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non Professional	Professional	Non Professional	Unweighted Mean
Omnibus	56%	58%	51%	24%	47.3%
Binary	68%	55%	37%	27%	46.8%

All N.S.

2. Parental Certificate Aspiration for Pupil

Percentage aspiring to certificates

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non Professional	Professional	Non Professional	Unweighted Mean
Omnibus	56%	65%	57%	28%	51.5%
Binary	79%	60%	51%	32%	55.5%

All N.S.

3. English Forecast

Percentage which had a chance of O Grade and better

	V.R.Q. HIGH			V.R.Q. LOW			
	Professional		Non Professional	Professional		Non Professional	Unweighted Mean
Omnibus	22%	NS	37% *	26%	NS	29% NS	28.5%
Binary	57%		50%	29%		26%	40.5%

* significant at 0.05 level Chi-square = 3.89

4. Arithmetic Forecast

Percentage which had a chance of O Grade and better

	V.R.Q. HIGH			V.R.Q. LOW			
	Professional		Non Professional	Professional		Non Professional	Unweighted Mean
Omnibus	56%	NS	39% *	23%	NS	16% **	33.5%
Binary	68%		56%	40%		33%	49.3%

* significant at 0.01 level Chi-square = 6.72
** significant at 0.01 level Chi-square = 25.20

5. French Forecast

Percentage which had a chance of O Grade and better

	V.R.Q. HIGH		V.R.Q. LOW		
	Professional	Non Professional	Professional	Non Professional	Unweighted Mean
Omnibus	13%	0%	10%	0%	5.8%
Binary	4%	3%	8%	0%	3.8%

All N.S.

APPENDIX 5(a) (to Chapter 8)

STAFFING

TABLE 1.

NUMBER OF DIFFERENT TEACHERS OVER 5 YEAR PERIOD

Subject	1	2	3	4	5	6	7	8	9	Total	Mean
ENGLISH	24	66	109	39	22	11	6	3	–	280	3.15
ARITHMETIC	50	109	76	37	7	1	–	–	–	280	2.45
MATHEMATICS	56	93	74	29	4	1	–	–	–	257	2.39
HISTORY	65	111	51	16	2	–	–	–	–	245	2.10
GEOGRAPHY	78	120	42	9	–	–	–	–	–	249	1.93
FRENCH	21	52	40	11	6	5	5	2	1	143	2.86
LATIN	8	14	15	2	–	–	–	–	–	39	2.28
SCIENCE*	42	44	31	20	9	3	1	2	–	152	2.56
PHYSICS	8	41	28	14	9	3	–	–	–	103	2.84
CHEMISTRY	10	46	38	7	1	–	–	–	–	102	2.44
BIOLOGY	13	22	13	–	1	–	–	–	–	49	2.06
TECHNICAL	21	29	14	12	17	7	6	11	6	123	3.90
HOMECRAFT	34	41	17	12	8	4	3	–	1	120	2.58
ART	58	103	54	27	10	5	–	–	–	257	2.39

* excludes schools which differentiated Science into Physics, Chemistry and/or Biology in the first school year. This applies to Tables 2 – 8 in this appendix.

TABLE 2.

AVERAGE NUMBER OF DIFFERENT TEACHERS PER YEAR OVER 3 YEARS

Subject	Less than 1.5	1.5 and more but less than 2.5	2.5 and more	Total
ENGLISH	205 (73%)	67 (22%)	8 (3%)	280
ARITHMETIC	258 (92%)	20 (7%)	2 (1%)	280
MATHEMATICS	222 (86%)	35 (14%)	– –	257
HISTORY	221 (90%)	24 (10%)	– –	245
GEOGRAPHY	222 (89%)	25 (10%)	2 (1%)	249
FRENCH	104 (73%)	29 (20%)	10 (7%)	143
LATIN	31 (79%)	8 (21%)	– –	39
SCIENCE	106 (70%)	42 (28%)	4 (3%)	152
PHYSICS	79 (77%)	22 (21%)	2 (2%)	103
CHEMISTRY	93 (91%)	9 (9%)	– –	102
BIOLOGY	40 (82%)	8 (16%)	1 (2%)	49
TECHNICAL	54 (44%)	31 (25%)	38 (31%)	123
HOMECRAFT	80 (67%)	35 (29%)	5 (4%)	120
ART	185 (72%)	60 (23%)	12 (5%)	257

TABLE 3

PERCENTAGE OF PUPILS IN EACH TYPE OF SCHOOL EXPERIENCING MORE THAN AN AVERAGE OF 1.5 TEACHERS PER YEAR OVER THE 3 YEAR PERIOD

Subject	3 Year	4 Year	Omnibus	6 Year Selective
ENGLISH	25%	32%	36%	16%
ARITHMETIC	7%	14%	9%	1%
MATHEMATICS	8%	34%	6%	2%
HISTORY	7%	15%	11%	7%
GEOGRAPHY	7%	11%	13%	11%
FRENCH	N/A	56%	21%	16%
LATIN	N/A	N/A	22%	20%
SCIENCE	27%	45%	5%	0%
PHYSICS	N/A	N/A	45%	13%
CHEMISTRY	N/A	N/A	24%	1%
BIOLOGY	N/A	N/A	27%	0%
TECHNICAL	4%	82%	80%	26%
HOMECRAFT	20%	49%	46%	12%
ART	0%	37%	32%	32%

TABLE 4

EXPERIENCE OF TEACHERS

Subject	Inexperienced	Fairly Experienced	Reasonably Experienced	Well Experienced	Total	No Information
ENGLISH	29 (11%)	69 (25%)	86 (32%)	87 (32%)	271	9
ARITHMETIC	31 (11%)	68 (25%)	85 (31%)	89 (33%)	273	7
MATHEMATICS	29 (11%)	52 (19%)	78 (29%)	92 (34%)	267	6
HISTORY	24 (10%)	66 (28%)	60 (25%)	88 (37%)	238	7
GEOGRAPHY	37 (15%)	68 (28%)	43 (18%)	94 (39%)	242	7
FRENCH	16 (11%)	55 (39%)	39 (28%)	30 (21%)	140	3
LATIN	3 (8%)	5 (13%)	12 (31%)	19 (49%)	39	–
SCIENCE	23 (16%)	56 (38%)	23 (16%)	44 (30%)	146	6
PHYSICS	18 (17%)	32 (31%)	31 (30%)	22 (21%)	103	–
CHEMISTRY	11 (11%)	20 (20%)	46 (45%)	25 (24%)	102	–
BIOLOGY	11 (22%)	20 (41%)	3 (6%)	15 (31%)	49	–
TECHNICAL	3 (3%)	20 (17%)	60 (50%)	37 (31%)	120	3
HOMECRAFT	9 (8%)	45 (38%)	26 (22%)	37 (32%)	117	3
ART	26 (10%)	38 (15%)	80 (32%)	107 (43%)	251	6

TABLE 5

PERCENTAGE OF PUPILS IN EACH TYPE OF SCHOOL EXPERIENCING TEACHERS OF "ABOVE AVERAGE" EXPERIENCE (CATEGORY 3 AND 4)

Subject	3 Year	4 Year	Omnibus	6 Year Selective
ENGLISH	61%	51%	55%	61%
ARITHMETIC	66%	51%	81%	66%
MATHEMATICS	67%	64%	81%	64%
HISTORY	66%	54%	57%	69%
GEOGRAPHY	66%	60%	50%	54%
FRENCH	N/A	56%	41%	49%
LATIN	N/A	N/A	100%	73%
SCIENCE	69%	32%	52%	50%
PHYSICS	N/A	N/A	45%	54%
CHEMISTRY	N/A	N/A	39%	84%
BIOLOGY	N/A	N/A	21%	69%
TECHNICAL	90%	67%	100%	83%
HOMECRAFT	53%	44%	50%	70%
ART	63%	69%	74%	86%

TABLE 6

QUALIFICATIONS

Subject	Certificated teacher (Hon. Graduates only)	Certificated teacher (Graduates only)	Certificated & Uncertificated teacher	Uncertificated teacher only	Total	No Information
ENGLISH	47 (17%)	174 (63%)	43 (13%)	13 (5%)	277	3
ARITHMETIC	26 (9%)	204 (73%)	42 (15%)	7 (3%)	279	1
MATHEMATICS	26 (10%)	188 (74%)	39 (15%)	3 (1%)	255	2
HISTORY	82 (34%)	125 (51%)	21 (9%)	15 (6%)	244	1
GEOGRAPHY	102 (41%)	116 (47%)	18 (7%)	12 (5%)	248	1
FRENCH	40 (29%)	78 (56%)	22 (16%)	–	140	3
LATIN	37 (95%)	2 (5%)	–	–	39	–
SCIENCE	25 (16%)	81 (53%)	33 (22%)	13 (9%)	152	–
PHYSICS	38 (37%)	43 (42%)	22 (21%)	–	103	–
CHEMISTRY	63 (62%)	32 (31%)	7 (7%)	–	102	–
BIOLOGY	15 (31%)	32 (65%)	2 (4%)	–	49	–

Subject	Certificated only	Certificated & Uncertificated	Uncertificated only	Total	No Information
TECHNICAL	121 (98%)	2 (2%)	–	123	–
HOMECRAFT	97 (81%)	21 (18%)	1 (1%)	120	–
ART	253 (98%)	4 (2%)	–	257	–

TABLE 7

QUALIFICATION – PERCENTAGE OF PUPILS IN EACH TYPE OF SCHOOL EXPERIENCING HONOURS GRADUATES (CERTIFICATED) ONLY

Subject	3 Year	4 Year	Omnibus	6 Year Selective
ENGLISH	7%	0%	13%	40%
ARITHMETIC	2%	0%	0%	29%
MATHEMATICS	2%	0%	0%	29%
HISTORY	0%	0%	59%	59%
GEOGRAPHY	0%	17%	67%	65%
FRENCH	N/A	25%	23%	33%
LATIN	N/A	N/A	89%	97%
SCIENCE	25%	7%	10%	50%
PHYSICS	N/A	N/A	21%	44%
CHEMISTRY	N/A	N/A	33%	25%

TABLE 8

PERCENTAGE OF PUPILS IN EACH TYPE OF SCHOOL EXPERIENCING AT LEAST SOME UNCERTIFICATED TEACHERS

Subject	3 Year	4 Year	Omnibus	6 Year Selective
ENGLISH	12%	34%	20%	8%
ARITHMETIC	5%	40%	4%	7%
MATHEMATICS	0%	35%	4%	7%
HISTORY	11%	52%	0%	0%
GEOGRAPHY	11%	34%	4%	1%
FRENCH	N/A	56%	41%	49%
LATIN	N/A	N/A	0%	0%
SCIENCE	0%	63%	0%	0%
PHYSICS	N/A	N/A	55%	6%
CHEMISTRY	N/A	N/A	21%	0%
BIOLOGY	N/A	N/A	6%	0%
TECHNICAL	8%	0%	0%	0%
HOMECRAFT	5%	2%	0%	0%
ART	0%	5%	0%	0%

APPENDIX 5(b)

TABLE 1

PERCENTAGE PASS RATES IN SIX SUBJECTS RELATED TO THE THREE TEACHER VARIABLES

Low Ability Group (V.R.Q's ≤ 110)

Subject	Number of Teachers		Experience of Teachers		Qualifications of Teachers	
	Few	Many	Greater	Lesser	Better	Poorer
ARITHMETIC	58%	57%	56%	61%	71%	51%**
(number)	612	145	453	304	245	512
MATHEMATICS	33%	18%**	24%	37%**	46%	23%**
(number)	639	118	371	386	245	512
ENGLISH	64%	60%	58%	67%*	73%	58%**
(number)	424	333	409	348	229	528
FRENCH	25%	7%**	20%	18%	26%	14%**
(number)	512	245	361	396	317	440
PHYSICS	24%	9%**	18%	17%	24%	13%**
(number)	403	354	331	426	294	463
CHEMISTRY	21%	8%**	20%	15%*	18%	17%
(number)	554	203	323	434	310	447

* significance at 0.05 level

** significance at 0.01 level

TABLE 2

PERCENTAGE PASS RATES IN SIX SUBJECTS RELATED TO THE THREE TEACHER VARIABLES

High Ability Group (V.R.Q's ≥ 110)

Subject	Number of Teachers		Experience of Teachers		Qualifications of Teachers	
	Few	Many	Greater	Lesser	Better	Poorer
ARITHMETIC	86%	85%	83%	89%*	88%	83%
(number)	500	163	347	316	369	294
MATHEMATICS	75%	55%**	62%	72%**	75%	55%**
(number)	369	294	363	300	369	294
ENGLISH	93%	85%**	90%	89%	93%	85%**
(number)	347	316	296	367	348	315
FRENCH	63%	43%**	68%	45%**	73%	42%**
(number)	356	307	255	408	257	406
PHYSICS	46%	29%**	42%	31%**	43%	32%**
(number)	369	294	425	238	382	281
CHEMISTRY	38%	41%	44%	24%**	41%	34%
(number)	604	59	457	206	380	283

* significance at 0.05 level

** significance at 0.01 level

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